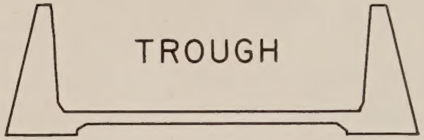
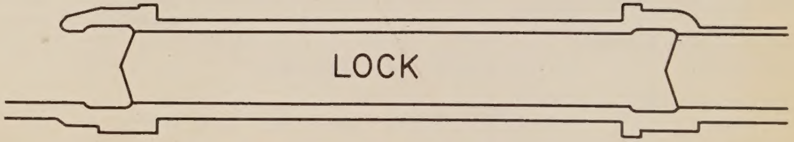
James J. Murphy

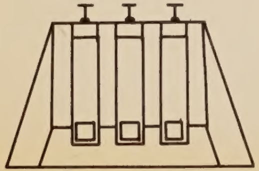
STRUCTURE CONDITION REPORT

STONE BARGE ENTERING LOCK 35 AT LOCKPORT

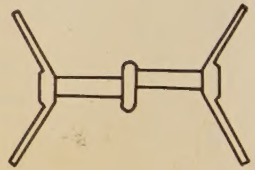


BICENTENNIAL BARGE AT MEDINA





WASTE GATE



GUARD GATE

BARGE CANAL
FAIRPORT–LOCKPORT

MATERIALS BUREAU

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
Raymond T. Schuler, Commissioner

1220 Washington Avenue, State Campus, Albany, New York 12232

February 28, 1977

Mr. George M. Briggs, Director
Transportation Maintenance Division
NYS Department of Transportation
1220 Washington Avenue
Albany, NY 12232

Dear Mr. Briggs:

Transmittal of Structure Condition Report
Barge Canal - Western Section - Fairport to Lockport
Region 4 PIN 4940.29-101
Region 5 PIN 5940.19-101

In accordance with your original request of December 16, 1974, this Bureau has evaluated the condition of the portland cement concrete in the structures and 38 of the 97 culverts located on the Barge Canal between Fairport and Lockport. This evaluation was conducted utilizing the following techniques:

Core samples were obtained and analyzed from areas of each structure.

Compressive strengths were obtained from selected cores.

Each structure was sounded to determine both the presence of delaminated concrete and to supplement the information obtained from the cores.

The overall surface condition of the concrete in each structure was visually inspected and photographed.

Culverts were visually inspected and photographed.

The conclusions and recommendations included in this report result from the summary of the information obtained from these evaluation techniques coupled with the intended function of each structural component.

Bureau personnel participating in this evaluation include: S. J. Candib, D. M. Sweredoski, C. G. Holub, J. J. DiFabio, D. Jarose and J. Pepe. J. J. Murphy and T. E. Wohlscheid coordinated the evaluation for the Bureau. Formal acknowledgement of the assistance and cooperation received from the following Region 4 personnel is herein noted: C. K. Burkwit, Regional Waterways Maintenance Engineer, and his entire staff, T. J. Mahaney, Technical Services Engineer and C. R. DiCenzo, Materials Engineer.

We would also like to extend our appreciation to typists Frances Spychalski, Beverly Gibbs, Ceil Leonard and Marge Elwood. Without their extra efforts and cooperation, this report could not have been timely prepared.

This report details the condition of the concrete in the structures for the subject canal area and should be used in conjunction with reports from other involved Bureaus and Subdivisions in evaluating the overall canal condition. If any questions arise concerning this report, please contact this Bureau. The structure condition report evaluating the nine structures between Fairport and Lock 33 was previously forwarded to you on August 1, 1975.

Historical data and additional information obtained on this section of the Canal was researched by Mr. Sam Candib. He would like to personally thank Mr. J. Stellato and his staff, Mr. C.K. Burkwit and his staff, Waterways Personnel at Pittsford and Lockport, and employees at the Syracuse Canal Museum and Rochester Public Library for their assistance in completing this portion of the investigation.

Very truly yours,

HARRY H. McLEAN
Director, Materials Bureau

By

Thomas E Wohlscheid

THOMAS E. WOHLSCHEID P.E.

STRUCTURE CONDITION REPORT

BARGE CANAL - WESTERN SECTION

FAIRPORT TO LOCKPORT

REGION 4 P. I. N. 4940.29 - 101

REGION 5 P. I. N. 5940.19 - 101

MATERIALS BUREAU

ALBANY NEW YORK

FEBRUARY 1977

TABLE OF CONTENTS

	PAGE
PROJECT LOCATION	1
CANAL SYSTEM FACT SHEETS	2
INTRODUCTION	4
GENERAL CONCLUSIONS	6
CORE COMPRESSION TEST RESULTS (STRUCTURES BETWEEN ROCHESTER AND LOCKPORT)	7
GLOSSARY OF TECHNICAL TERMS	8
STRUCTURE LOCATIONS	10
GUARD GATES	26
Spencerport	28
Brockport	34
Holley	38
Albion	43
Medina	48
Middleport	54
Gasport	59
Pendleton	65
WASTE GATE AND WEIRS	69
Fairport	72
Greece	75
Spencerport	77
Adams Basin	82
Brockport	87
Holley	91
Brockville	95
Albion	99
Eagle Harbor	104
Medina	108
Middleport	114
Watsons	118
Gasport	122
Lockport	126

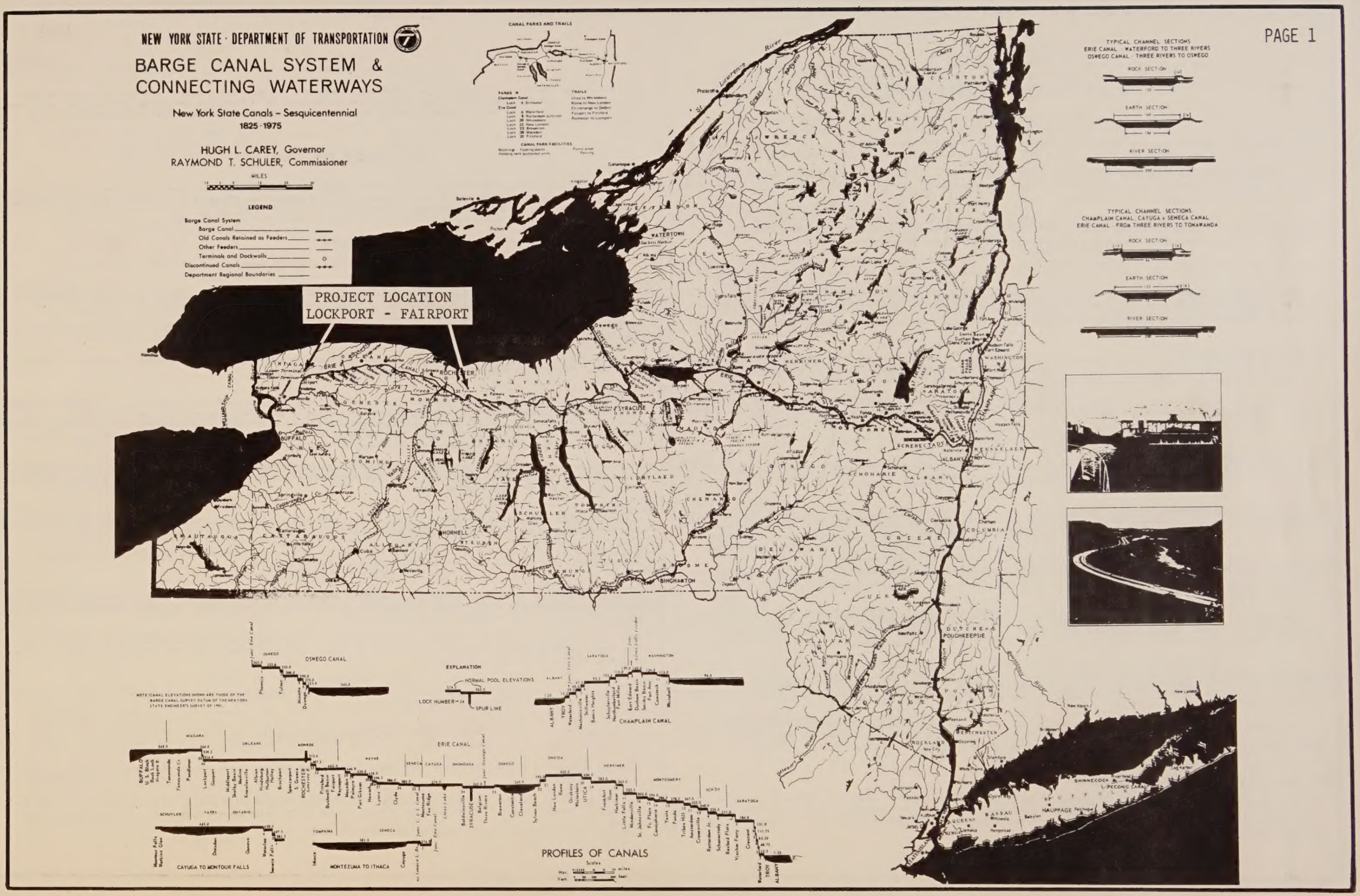
	PAGE
HOLLEY TROUGH	132
EAGLE HARBOR TROUGH	141
MEDINA TROUGH	147
LOCKS AT LOCKPORT	153
BROCKVILLE QUARRY WALL	171
CANAL CULVERTS	172
CULVERT LISTING AND DESCRIPTION	178
CULVERT 26, 27	183
" 28	186
" 29	188
" 30	191
" 30½, 31	197
" 33, 34	200
" 35	203
" 43	205
" 44	207
" 45	209
" 46, 47	211
" 48, 49	214
" 50, 51	218
" 52, 53	221
" 54	225
" 55, 55½, 56	228
" 57	232
" 58, 58½,59, 59½	234
" 60	239
" 61, 62	241
" 63, 64	245
" 65	248
" 66, 67	250
" 68, 69	253
" 70, 71, 72	256

TABLE OF CONTENTS

	PAGE
CULVERT 73, 73½, 74	260
" 75, 76	264
" 77	267
" 78, 79, 80	271
" 82, 83	275
" 84, 85	278
" 86	281
" 87, 88, 89	283
" 90, 91	287
" 92	290
" 93, 94	294
" 95	297
" 96	300
" 97, 98	306
" 99	309
" 99½, 100	315
" 101, 102	317
" 103	320
" 104, 105	324
" 107	327
" 108, 109	332
" 110	337
" 111, 112	339
" 113	343
" 114, 115	345
" 115½, 116, 117	348
" 118	352
" 119	355
" 120	357
" 121, 122	359
" 123	363
" 124, 125	366

BUSHNELLS BASIN TO CARTERSVILLE	PAGE
IRONDEQUOIT AND BUSHNELL BASIN TROUGH FLOOR CORES	370
IRONDEQUOIT TROUGH FLOOR CORE DESCRIPTIONS	371
BUSHNELL BASIN TROUGH FLOOR CORE DESCRIPTIONS	374
CANAL FLOOR LINING	375
BUSHNELLS BASIN TO CARTERSVILLE-INTRODUCTION	377
BUSHNELLS BASIN TO CARTERSVILLE-HISTORY	379
BUSHNELLS BASIN TO CARTERSVILLE-CONTRACT PLANS	389
IRONDEQUOIT TROUGH-ANALYSIS OF 1912 BREAK	409

NYSDOT
Library
50 Wolf Road, POD 34
Albany, New York 12232



NEW YORK STATE · DEPARTMENT OF TRANSPORTATION
BARGE CANAL SYSTEM & CONNECTING WATERWAYS
New York State Canals – Sesquicentennial
1825-1975
HUGH L. CAREY, Governor
RAYMOND T. SCHULER, Commissioner
MILES
LEGEND
Barge Canal System
Barge Canal
Old Canals Retained as Feeders
Other Feeders
Terminals and Dockwalls
Discontinued Canals
Department Regional Boundaries
PROJECT LOCATION
LOCKPORT - FAIRPORT
CANAL PARKS AND TRAILS
TYPICAL CHANNEL SECTIONS
ERIE CANAL - WATERFORD TO THREE RIVERS
OSWEGO CANAL - THREE RIVERS TO OSWEGO
ROCK SECTION
EARTH SECTION
RIVER SECTION
TYPICAL CHANNEL SECTIONS
CHAMPLAIN CANAL, CAYUGA & SENECA CANAL
ERIE CANAL - FROM THREE RIVERS TO TONAWANDA
ROCK SECTION
EARTH SECTION
RIVER SECTION
OSWEGO CANAL
EXPLANATION
NORMAL POOL ELEVATIONS
LOCK NUMBER
SPUR LINE
CHAMPLAIN CANAL
ERIE CANAL
CAYUGA TO MONTOUR FALLS
MONTEZUMA TO ITHACA
PROFILES OF CANALS
BUFFALO
ROCHESTER
SYRACUSE
UTICA
SCHENECTADY
ALBANY
TROY
WATERTOWN
OSWEGO
BINGHAMTON
POUGHKEEPSIE
HORNELL
HAUPPAGE

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION

NEW YORK STATE BARGE CANAL SYSTEM FACT SHEETS

HISTORY

Early State Canals

The first canals constructed by New York State were the Erie and Champlain, begun on July 4, 1817 and opened by Governor DeWitt Clinton--sometimes called the father of New York State's public works concept--on October 26, 1825.

The original Erie Canal was completed at a cost of $7 150 000. It extended from Albany westward to Buffalo, was 40 feet wide and 4 feet deep, and could accommodate boats of about 30 tons capacity, towed by horses or mules. It had 83 locks, each of which was 90 feet long and 15 feet wide.

The Champlain, of the same dimensions as the Erie, generally followed the route of the Champlain Division of the present Barge Canal System--through the Hudson River to Fort Edward, thence northward to Whitehall and Lake Champlain. The Oswego and the Cayuga and Seneca Canals were completed in 1828 and opened to navigation in 1829.

The first enlargement began in 1836 and was completed in 1862, providing a channel 70 feet wide and 7 feet deep to handle boats of 240 tons capacity. The cost of this enlargement plus subsequent improvements through 1895 totaled $80 000 000.

The canals originally were toll facilities and as such contributed substantially to revenues of the State. Up to 1883, when it was voted to discontinue tolls, State canals had earned $43 000 000 above costs of construction, enlargement, and operation. The canals have since remained toll-free.

1894 Constitutional Convention

As early as 1884 public opinion was developing for enlargement and improvement of existing canals in New York State, with the general public participating extensively in heated discussion, controversy, and agitation for both canal improvement and canal abandonment, as well as for a ship canal from the Hudson River to Lake Erie.

Influenced by the prevailing sentiment for canal improvement, the 1892 Legislature stipulated that one of the convention duties of delegates to the 1894 Constitutional Convention be "consideration of amendments relating to the care and improvement of the State Canals".

1902 Party Platforms

As a result of the action taken by the 1894 Constitutional Convention, both political parties at their convention in 1902 included a plank in their platform pledging the construction of a barge canal.

1903 Legislation and Election

The Barge Canal Referendum Bill was passed by the Senate and Assembly during the 1903 legislative session, and approved by the voters by a quarter-million vote majority in the November election.

Bond Issues and Toll-free Canal

In their vote to build the Barge Canal System, the people authorized a $101 000 000 bond issue for its construction--the largest issue approved by a single state up to that time. They also reaffirmed the earlier decision that State canals remain toll-free.

Later bond issues in 1909, 1911, and 1915 brought the total of construction appropriations to $154 800 000, including provision for improvement of the Cayuga and Seneca Canal to barge canal dimensions and construction of freight terminals. The canal bonded indebtedness is scheduled to be extinguished in 1971.

Barge Canal Construction

Construction of the new system, mostly on new location, began in 1905. River and lake channels were utilized wherever possible. The new canals were put into operation as sections were completed, and in 1918 the entire Barge Canal System was in service.

The new system included many engineering innovations, such as large-scale use of cement concrete, movable dams, and electric instead of manual operation of locks. With the increased dimensions of the new canals, the tug boat and the self-propelled barge became familiar sights, while the towpaths of the original Erie became relics of the past. The modern era of inland waterway transportation was under way.

GREAT LAKES - HUDSON RIVER WATERWAY IMPROVEMENT

In 1935, after economic studies by the U. S. Army Corps of Engineers indicated a benefit to cost ratio of better than 2 to 1, the Federal Government authorized a federal aid improvement project for the 184-mile section of the Barge Canal System between Oswego on Lake Ontario and Waterford on the Hudson River, designated as the "Great Lakes-Hudson River Waterway Improvement".

Administered by the State and financed by the Federal Government, the improvement project provided for widening and deepening the channels, deepening through the locks and guard gates to 13 feet, and increasing overhead clearance under fixed bridges to 20 feet. After delays caused by World War II and the Korean conflict, the improvement project was completed in 1968.

THE BARGE CANAL SYSTEM

Mileage

The New York State Barge Canal System is 524 miles in length, of which 10 miles are sidelines to canal harbors at Utica, Syracuse, and Rochester. Canalized rivers, streams, and lakes account for 370 miles of the total, while the remaining 154 miles are artificial land-cut sections.

Canal Divisions

The Barge Canal System consists of four canals, or divisions:

1. Champlain Canal
2. Erie Canal
3. Oswego Canal
4. Cayuga and Seneca Canal

Champlain Canal

The Champlain Canal extends from Waterford on the Hudson River to Whitehall at the southern tip of Lake Champlain. It utilizes the canalized Hudson River to Fort Edward, thence to Whitehall it is an artificial land-cut channel.

This canal is 60 miles long, consisting of 37 miles of river section and 23 miles of land-cut section. It has 11 locks (5 in the river section and 6 in the land-cut section), 1 guard gate, and 5 canal terminals.

The Federal Government marks and maintains a navigation channel in Lake Champlain from Whitehall north to Port Henry, Burlington, Plattsburgh, and Rouses Point.

Erie Canal

The Erie Canal stretches from Waterford westerly across the State to Tonawanda on the Niagara River. It uses the Mohawk River to Frankfort, continues as an artificial land-cut channel to New London west of Rome, and then uses Wood Creek, Oneida Lake, Oneida River, Seneca River, and Clyde River to Lyons. From Lyons to Lockport, the Erie Canal is an artificial land-cut channel, often located higher than the adjacent countryside, sometimes by as much as 60 feet. The last segment from Lockport to Tonawanda consists of a land-cut section and the canalized Tonawanda Creek.

This canal is 348 miles long, consisting of 220 miles of canalized rivers and lakes and 128 miles of land-cut channels. It has 35 locks (18 in river sections and 17 in land-cut sections), 2 guard locks, 10 movable dams, 2 taintor gate dams, 24 guard gates, and 42 canal terminals.

Oswego Canal

The Oswego Canal utilizes the Oswego River which flows northerly from Three Rivers Point, a junction on the Erie Canal west of Syracuse, to its outlet at Oswego on Lake Ontario.

This canal is 24 miles long and has 7 locks and 2 terminals. It also has 7 fixed dams, of which 5 have regulating taintor gates. All the dams have vertical head gates at power sluiceways.

Cayuga and Seneca Canal

The Cayuga and Seneca Canal extends from the junction of the Seneca and Clyde Rivers at May's Point on the Erie Canal to Ithaca on Cayuga Lake and Montour Falls, just south of Watkins Glen, on Seneca Lake. It utilizes the Seneca River and Cayuga and Seneca Lakes, the largest of the Finger Lakes.

This canal is 92 miles long, consisting of canalized river and lakes sections except for 2½ miles of land-cut section from Watkins Glen to Montour Falls and about ¼ mile in Ithaca. It has 4 locks in the canalized Seneca River, 1 taintor gate dam, 4 guard gates, and 2 terminals.

Other Structures

Canal structures in addition to those already listed include such facilities as bypasses, spillways, syphons, culverts, approach walls, dykes, flumes, canal retaining walls, etc.

BARGE CANAL DIMENSIONS

Locks

There are 57 locks on the New York State Barge Canal System. The lock gates and valves are operated by electrically powered machinery.

The lock chamber is 328 feet long and 45 feet wide. The distance between sills permits an available length of 300 feet for floats. Depth of water over the sills is 12 feet, except on the Great Lakes - Hudson River Waterway where it is 13 feet.

Channels
The following channel dimensions prevail in the Barge Canal System:

	Great Lakes-Hudson River Waterway	All Other Routes
Channel width in river sections	200 feet	200 feet
Channel width in rock sections	120 feet	94 feet
Surface width in land-cut sections	160 feet	123 feet
Bottom width in land-cut sections	104 feet	75 feet
Depth	14 feet	12 feet

Bridges
Nearly 300 highway and railroad bridges span the canals. Their minimum vertical clearance above maximum navigable pool is 15½ feet, except on the Great Lakes - Hudson River Waterway where it is 20 feet. Their horizontal clearance is equivalent to the channel width.

FLOAT DIMENSIONS

Maximum Size
The maximum size of a float that can pass through a lock is: length 300 feet; beam 43½ feet; height above water 15 feet. Economical draft will range from 9½ to 12 feet, dependent on the route being transited.

A coupled barge and tug meeting these dimensions can transport 2 600 tons, or approximately 800 000 gallons of gasoline. A self-propelled barge of 300 feet in length, called a "jumbo" has a capacity of 3 600 tons, or about 1 100 000 gallons of gasoline.

OPERATION OF CANALS

Navigation Season

The navigation season usually extends from mid-April through November.

Commercial Vessels

Commercial vessels are afforded passage through the system around the clock each day during the navigation season. Where traffic warrants, the locks and lift bridges are operated 24 hours a day. In other areas, arrangements can be made for passage during non-operating hours.

Pleasure Craft

Pleasure craft are passed through the system in accordance with a published pleasure boat operating schedule prepared to reflect seasonal pleasure boating patterns and favorable commercial traffic patterns.

MAINTENANCE OF CANALS

Facilities
Canal structures, channels, and banks are maintained and repaired with land-based construction equipment and personnel, as well as with floating plant equipment (dredges, derrick boats, etc.) and personnel.

Canal channels are marked and outlined with buoy lights, stake lights and stake reflectors.

WATER SUPPLY AND SUMMIT LEVELS

General
The Barge Canal System is distinctively a river canalization facility. The natural flows in the canalized streams and numerous lakes supply the water needs of the canals to a large degree. However, in some locations it is necessary to augment these natural flows. This is accomplished by supplying water, usually from reservoirs, to the summit level of a canal--the highest navigation level on a canal. From the summit level, water is passed to the lower elevations on both sides.

Champlain Summit Level
The summit level of the Champlain Canal is located at Smith's Basin between Locks C-8 and C-9. It is supplied by the Glens Falls Feeder which takes water from the Hudson River west of Glens Falls.

Erie Summit Levels
The Erie Canal has two summit levels--the Rome level between Locks E-20 and E-21, and the Tonawanda level from the Niagara River at Tonawanda to Lock E-35 at Lockport.

The Rome summit level is supplied from two large canal reservoirs located north of Rome and Utica. These are the Delta and Hinckley Reservoirs, the former of which is supplied in turn by seven small Old Erie Canal reservoirs located in the Adirondack Mountains. In addition, nine small Old Erie Canal reservoirs situated south of Utica-Rome-Syracuse also supply this level.

The Tonawanda summit level is supplied by the Niagara River, carrying Lake Erie waters to supply the Erie Canal east to Rochester, and to augment the supply from Rochester to the Oswego River.

Oswego Summit Level

The Oswego Canal has no summit level. It is supplied with surplus navigation water from the Erie and Cayuga and Seneca Canals.

Cayuga and Seneca Summit Level

The summit level of the Cayuga and Seneca Canal is Seneca Lake.

SYSTEM UTILIZATION

System Tonnage
The five-year average of cargoes transported on the New York State Barge Canal System is approximately 2.8 million tons annually. The highest tonnage in the System's history was 5.2 million tons in 1951, while the lowest was 1.2 million tons in 1919. Petroleum, and products derived from petroleum, are the primary cargoes transported. Other items shipped include cement and lime, sugar, molasses, chemicals and forest products.

Traffic Pattern
The traffic pattern in the latest year:

Tonnage originating in the State for:	
Delivery in the State	47.6%
Delivery out of the State	23.4%
Tonnage originating out of the State for:	
Delivery in the State	20.6%
Delivery out of the State	8.3%

Commercial Vessels
There are currently 51 tugs and 54 cargo carrying vessels operating on the Barge Canal System.

Pleasure Craft
Pleasure craft are not required to obtain permits to pass through the locks or under the movable bridges. New York State's registration law, however, requires that every mechanically propelled vessel, including sailboats that use auxiliary power, operated on the waters of the State must be registered and numbered. There are no size or horsepower limitations. U. S. Customs documented vessels are exempt. Registration responsibility rests with the Office of Parks and Recreation, Division of Marine and Recreational Vehicles, South Mall, Albany, New York, 12223.

Other Uses
Along with its principal role as a navigable waterway, the Barge Canal System serves as a water resource, supplying waters for domestic and sanitary purposes, industrial processing, irrigation of farm crops, generation of electric power, breeding grounds for fish and wildlife and variety of recreational activities.

As a recreational facility, the Barge Canal System offers a wide range of outdoor activities both on water and along its banks. Cruising, sailing, canoeing, fishing and swimming are popular pastimes on its waters, while along its banks, canal parks and trailways provide marine services and opportunities for picnicking, hiking and cycling.

WATERWAYS MAINTENANCE SUBDIVISION
MAY 1973

INTRODUCTION

This report was prepared at the request of George M. Briggs, Director of the Transportation Maintenance Division. The request initially resulted from a failure that occurred in the Bushnell Basin Trough on October 29, 1974, during construction of a sewer tunnel under the canal embankment. The tunneling operation was being performed by a contractor working on a project for the Irondequoit Bay Pure Waters District.

Mr. Brigg's request was translated into a work plan prepared by Lyndon H. Moore, Director of the Soil Mechanics Bureau and Project Coordinator for the Technical Services Subdivision. Mr. Moore's work plan included a "Purpose," a "Scope," and an "Investigation Schedule," defined as follows:

"PURPOSE - To develop long range monitoring and maintenance programs to provide continuous and efficient operation of the canal system and to insure public safety."

"SCOPE - To inspect and document the condition of the present canal system; to evaluate the condition and prepare recommendations for future corrective and preventive maintenance and monitoring programs."

"INVESTIGATION SCHEDULE -

Area 1 - Irondequoit Basin - Fairport to Lock 33 - 9 miles

Area 2 - Wayne County Line to North Gates - 23 miles minus Area 1

Area 3 - North Gates to Lockport - 40 miles."

Under the scope outlined, the Materials Bureau staff began a program to evaluate the condition of the concrete in the structures located in Area 1 between Fairport and Lock 33. The first portion of the evaluation was completed and submitted to the Transportation Maintenance Division on August 1, 1975.

Included in this report are the evaluations of the structures located in both Areas 2 and 3 and 38 of the 97 culverts located in all three areas. A complete listing of these structures are:

STRUCTURES INVESTIGATED

(East to West)

Guard Gates	Waste Gates and Weirs	Troughs	Locks
*Bushnells Basin	Fairport	**Bushnells Basin	*32
*Cartersville	*Bushnells Basin	**Irondequoit	*33
Spencerport	*Cartersville	Holley	34
Brockport	Greece	Eagle Harbor	35
Holley	Spencerport	Medina	
Albion	Adams Basin		

*See Previous Report, Fairport-Lock 33, August, 1975.
**See information in this report also.

STRUCTURES INVESTIGATED (Cont'd)

(East to West)

Guard Gates	Waste Gates and Weirs	
Medina	Brockport	
Middleport	Holley	
Gasport	Brockville	Brockville Quarry Wall
Pendleton	Albion	
	Eagle Harbor	
	Medina	
	Middleport	
	Watsons	
	Gasport	
	Lockport	

CULVERTS

Number 26 through Number 125 - Only 38 of the 97 culverts have been inspected to date.

These structures were originally constructed between 1910 and 1918. Over the years, numerous repairs to the structures were completed by both Waterways Maintenance Personnel and by Contract. Each structure, whether previously repaired or the original concrete, was evaluated to determine its present condition.

The evaluation of the structure consisted of a thorough inspection of the overall concrete surface condition. A total of 66 representative core samples were taken from areas of the structure which were indicative of typical conditions.

The required core depth to reach sound concrete was determined during the coring operation through the visual examination of each extracted core. When the field crew believed that sound concrete was reached, the coring operation was terminated for that particular core. Each core was later inspected in detail in the laboratory. These inspections revealed that a few of the cores contained minute fracture planes at the depth previously determined to be sound concrete by the field crew. These minute fracture planes indicated that isolated delaminations still existed in the concrete structure at the lower depth of the core. Minute fracture planes in a core are an indication of the beginning of concrete deterioration. The required depth to reach sound concrete is necessary for the estimation of repair quantities as concrete for structural repair should be bonded to sound concrete in order to insure a permanent repair.

The cores submitted for compressive strength testing are representative of the sound concrete in the structure from which the core was obtained. Severely fractured or deteriorated portions of the core were removed prior to compressive strength testing. Some of

the tested cores did contain minute fracture planes, which did not appreciably affect the compressive strength results. Cores which contained minute fracture planes were so noted.

Soundings of each structure were used to both supplement the information obtained from the cores and to detect the presence of delaminations. Generally, soundings were only obtained along the lower 6 feet of the concrete or wherever one could walk. These soundings were interpreted, through visual observation and cores, into an overall condition of the concrete in any one area. Each structure evaluation contains a "Percent Delamination Listing" which was mainly developed from soundings.

The intended function of each structure on this section of the Canal was also investigated and related both to the safety of the public and to the operation of the Canal. Locks serve the purpose of permitting boats to travel the Canal system. The condition of the concrete in the four locks on this section of the Canal has little effect on the safety of the public but, of course, does affect the operation of the Canal. Guard gates can be lowered to prevent the flow of water should a breach in the Canal occur. The condition of the concrete in the guard gates, retaining walls, trough sections and waste gates has an effect on both public safety and the operation of the Canal.

A glossary of the technical terms as used in this report is included to assist the reader.

GENERAL CONCLUSIONS

The majority of the concrete in the structures located between Fairport and Lockport is in good condition.

The evaluation revealed that most of the concrete deterioration present on these structures is surface related. All surface related deterioration has no detrimental effect on the safety of the public or the operation of the Canal. However, this surface deterioration does effect the esthetics of the structure.

Portions of the guard gates, waste gates,troughs and Lock 35 contain isolated areas of deep deterioration. This deterioration is not extensive and does not effect the safety or operation of the structure at the present time. However, future repairs are required.

Deterioration in the Middleport Guard Gate, the Spencerport Guard Gate and Waste Gate, Holley Guard Gate and the Holley Trough have progressed to where repairs are recommended in the near future. The present condition of all the evaluated structures is included in the report sections describing each structure individually.

Of the 97 culverts located under this section of the canal, 38 have been inspected and included in this report. The majority of these culverts will require only minor repairs, yearly inspections and cleaning. Culvert #96 is the only culvert that has a road (Culvert Road) passing through it. This culvert has had a number of constant leaks throughout its history. Flow from these leaks increased in August, 1976 and a contract to correct all leaks will be completed in the Spring of 1977. Repairs in the near future will also be required at Culverts #57 (Brockport Creek); #77 (West Branch Sandy Creek); #103 (Jeddo Creek); and #107 (Jeddo Creek). Details of the 38 inspected present culvert conditions are included in the report. The remaining culverts will be inspected and reported separately.

This evaluation summarizes the present condition of the concrete in the structures after over 60 years of service and exposure to weathering. Portions of the evaluated stone block arch culverts date back to 1825. The recommendations and conclusions cover both immediate and future repair needs to insure continued efficient and safe operations. These recommendations and conclusions have resulted from the concrete condition evaluation and the intended function of each structure.

In order to retard future concrete deterioration and to improve appearance, it is desirable to completely restore each structure. However, compliance only with our recommendations will not satisfy this goal. Therefore, we recommend that a comprehensive, long range program be formulated to restore each structure. Structure restoration should be performed on a priority system considering first, the condition of the structure and its effect on public safety, and second, the effect of the structure on the operation of the canal system.

Concrete Compression Test Results

Structure Location	Core No.	Compressive Strength (pounds per square inch)
Adams Basin Waste Gate	1	4030*
Adams Basin Waste Gate	4	3640
Albion Guard Gate	1	3775*
Albion Waste Gate	1	3515
Albion Waste Gate	2	7255
Brockport Waste Gate	1	4185
Brockport Wier	1	8870
Eagle Harbor Trough	1	2705*
Eagle Harbor Trough	2	5300*
Eagle Harbor Waste Gate	1	5790
Eagle Harbor Waste Gate	3	9175
Gasport Guard Gate	1	6125*
Gasport Weir	1	4485
Holley Guard Gate	2	4895*
Holley Trough	1	1680*
Holley Trough	4	6265
Holley Waste Gate	4	4040*
Holley Waste Gate	6	3600*
Lockport Waste Gate	1	6250
Lockport Waste Gate	3	3030
Lock 35	3	5915
Spencerport Guard Gate	2	2485*
Spencerport Waste Gate	2	3225*
Spencerport Waste Gate	3	5470*
Spencerport Weir	5	6265*
Watson Waste Gate	1	5815

*prefractured

GLOSSARY OF TECHNICAL TERMS

ABUTMENT - a concrete wall which acts as a retaining wall and supports the end of an overhead structure.

AGGREGATE - sand and stone of various sizes used with water and cement to form concrete.

BUFFER BEAM - a steel beam that can be swung out from the upper and lower guide walls. Its purpose was to prevent barges from accidently ramming the closed lock gates. They are no longer used.

BUTTRESS - a smaller vertical wall generally projecting at a right angle from another larger wall, to help prevent the larger wall from overturning.

COLD JOINT - an unintentional joint in concrete caused when a fresh layer of plastic concrete is placed upon a layer of concrete which has partially or completely set (hardened).

COMPRESSIVE STRENGTH - a term used to indicate the strength of concrete, designated as pounds per square inch (p.s.i.). It is calculated by dividing the applied load at fracture by the cross sectional area.

CONSTRUCTION JOINT - an intentional joint in concrete caused when a fresh layer of plastic concrete is abutted to a layer of hardened concrete. The function of a construction joint is to allow differential movement without damaging structural integrity.

CORE - a cylindrical sample of concrete (usually 4 inches in diameter) obtained by drilling with a thin walled tube.

DELAMINATION - cracking or fracturing of concrete under and in a direction parallel to its surface.

DETERIORATION - a condition of portland cement concrete which implies distress in the form of scaling, delamination, cracking, or efflorescence.

EFFLORESCENCE - a whitish, crystalline deposit on the surface of concrete caused by the evaporation of mineral bearing water as it exits from cracks in concrete.

EMBANKMENT - a bank of earth used to confine the canal above the level of the natural landscape.

FOOTING - a concrete substructure located at the bottom of a wall, pier, or column which distributes the weight and load downward into the underlying soil.

FRACTURE PLANE - an area of weakness in a concrete structure which may be evidenced either by a hollow, dull sound when the concrete is struck with a hammer, or by a crack in a core sample.

FREEZE-THAW CYCLE - cycles of alternate freezing and thawing resulting from weather conditions. It is usually associated with distress in the concrete caused by the expansive forces of freezing water.

GRAVITY WALL - a concrete retaining wall designed to be stable by virtue of its shape and weight.

GUIDE WALL - the walls at the upper and lower ends of the lock where boats are guided into the lock chamber.

INTENTIONAL BREAK - damage done to a core while removing it from the core hole during the coring operation. The core barrels are only capable of drilling a 12 inch long section at one time. After this first section is broken off and removed, the next 12 inch section can be drilled.

MEMBRANE WALL - that part of the waste gate which acts as a thin walled dam.

PIER - a concrete support used to hold up the center sections of a bridge or gate between the abutments.

PILE - wooden shafts driven into the earth to carry or transfer structure loads to the soil or to underlying rock.

RETAINING WALL - a structure designed to hold back a mass of earth.

SCALING - progressive disintegration of concrete surfaces resulting from expansive pressures generated by freezing of water.

SHEET PILE - wooden planks or steel sheets driven into the earth and used to control the underground flow of water and fine grained soils. Also referred to as sheeting.

SHOTCRETE - mortar or concrete conveyed through a hose and pneumatically projected at high velocity onto a surface. Shotcrete has been used for the repair of deteriorated surfaces in the canal.

SILL - a concrete slab which supports the bottom of a guard or lock gate.

SODA STRAW - a thin walled, hollow deposit of calcium carbonate and other minerals, hanging vertically from a concrete surface, that has the appearance of a soda straw.

SOUND CONCRETE - concrete which has acceptable compressive strength, durability and quality. Sound concrete does not contain fracture planes, delaminations or other forms of deterioration.

SOUNDING - a method used to determine delaminated concrete by striking the surface with a hammer. Delaminated concrete has a dull or hollow sound while good concrete has a clear ringing sound.

SPLAY WALL - an extension of the ends of an abutment or retaining wall that angles into the embankment to hold the earth in place. Also called wingwall.

STOP LOG COLUMN - slotted columns in front of the waste gate. In the event that an open sluice gate malfunctions, short sections of wood planks can be placed into the slots to stop the flow of water.

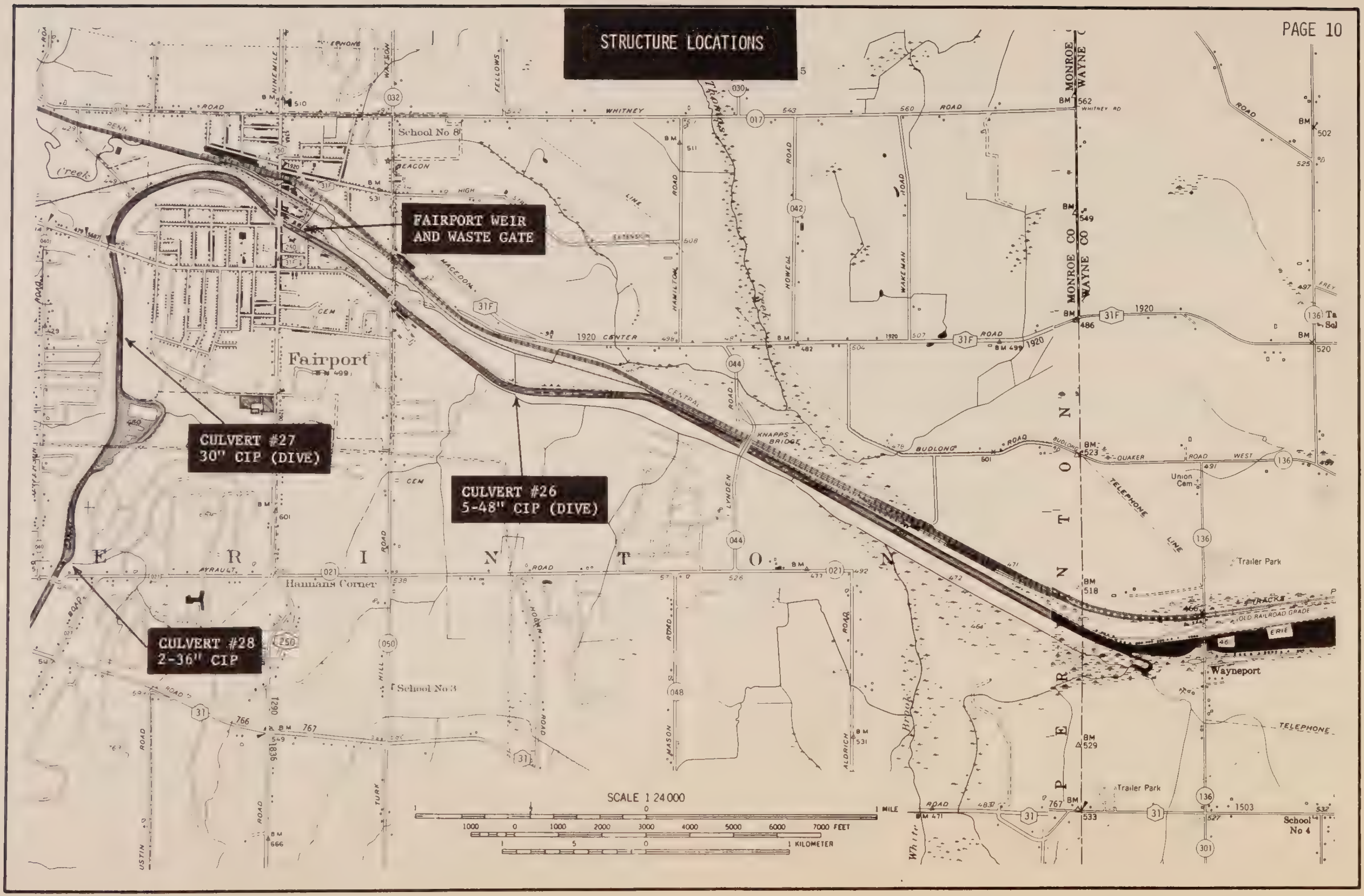
SUBSTRUCTURE - the concrete foundation (piers, columns, abutments, etc.) which supports the remainder of the structure.

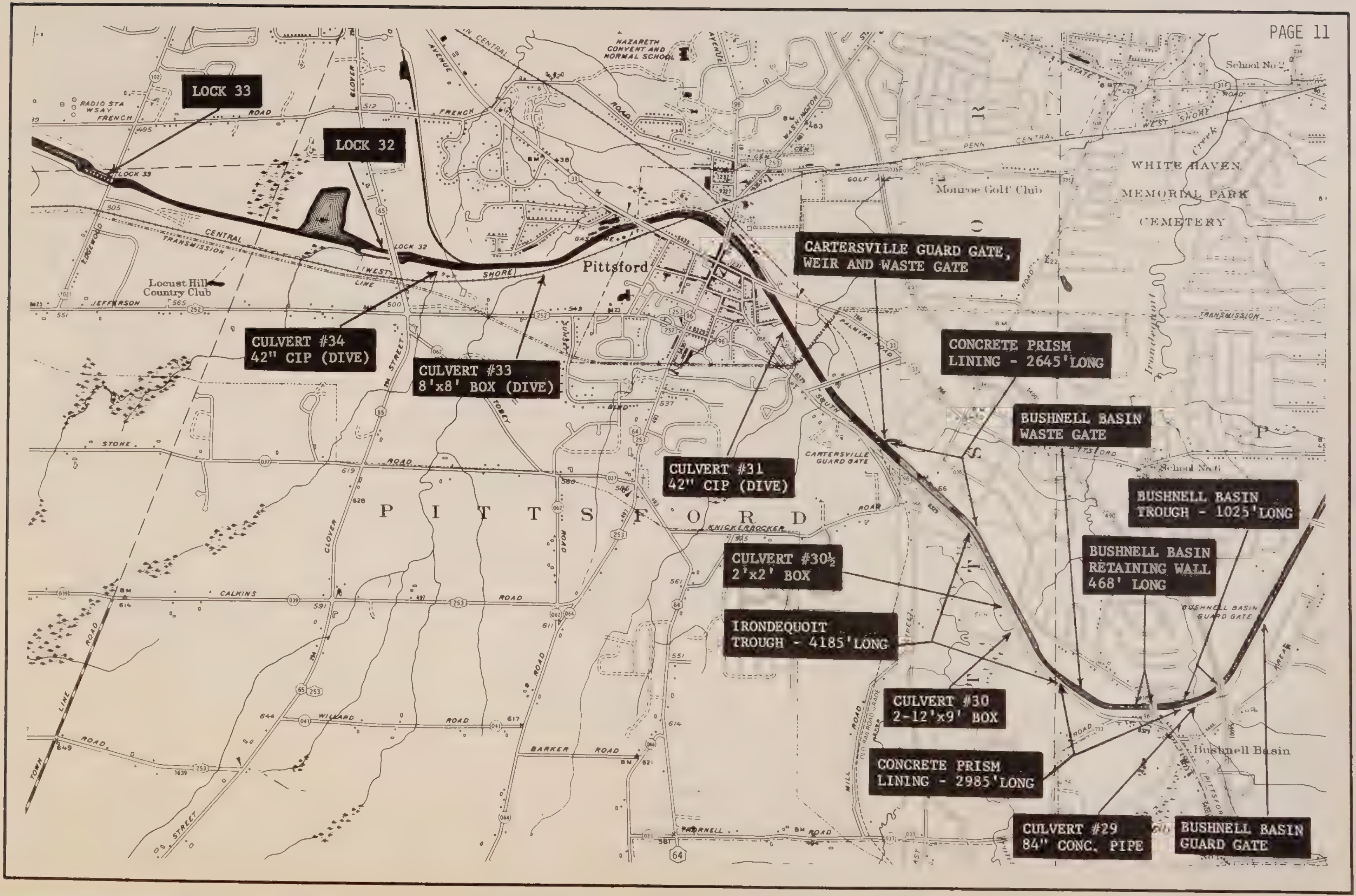
SURFACE DETERIORATION - deterioration that exists from 1 to 3 inches in depth into the structure, normally in the form of scaling or delamination.

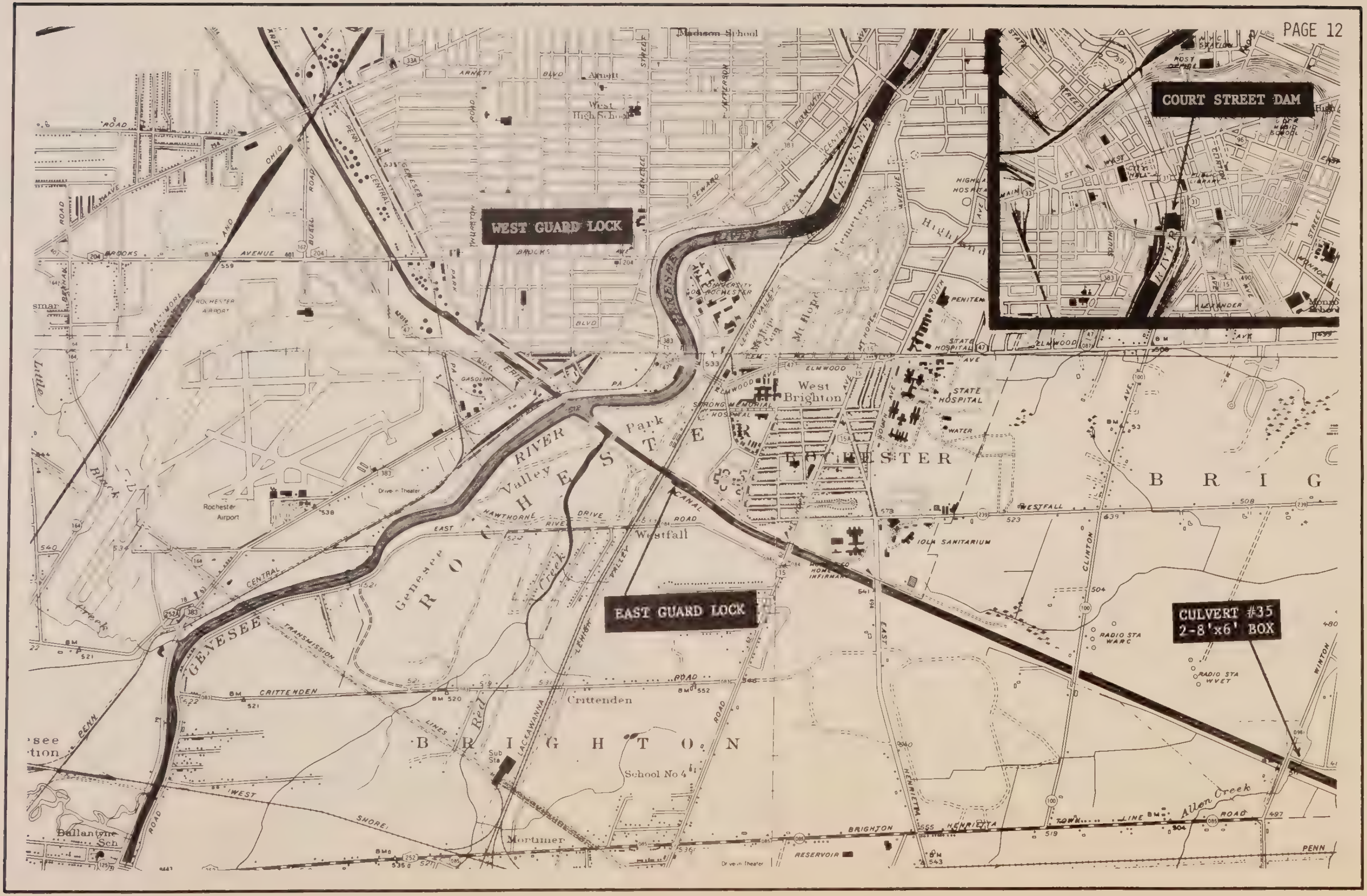
TOW PATH - narrow dirt road that runs along the edge of the canal. Originally, this road was used to tow the barges on the old Erie Canal. Presently, it serves as a maintenance and recreation road.

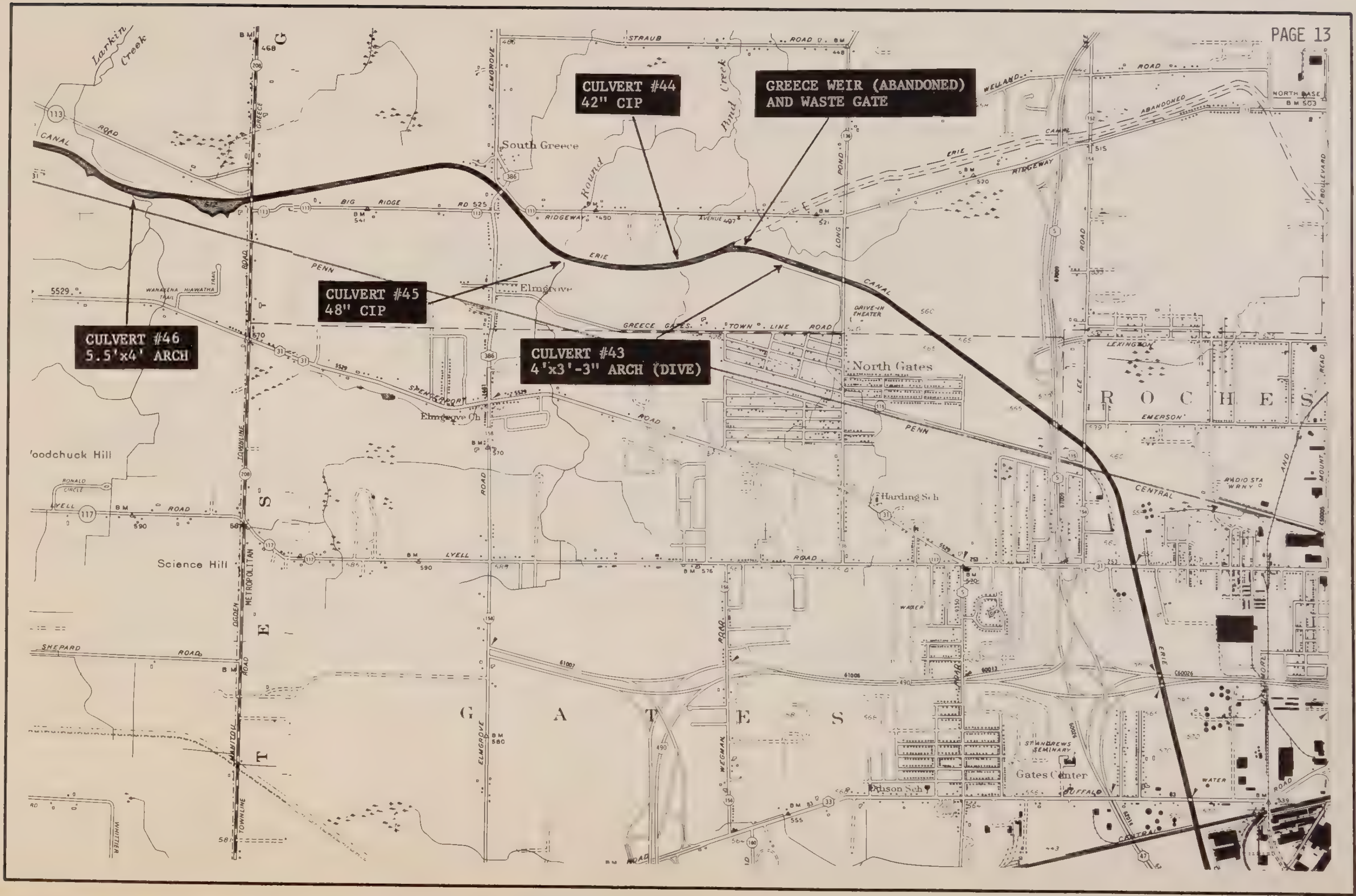
TYPICAL CONDITION - that condition which is representative and prevalent over the majority of the structure or substructure.

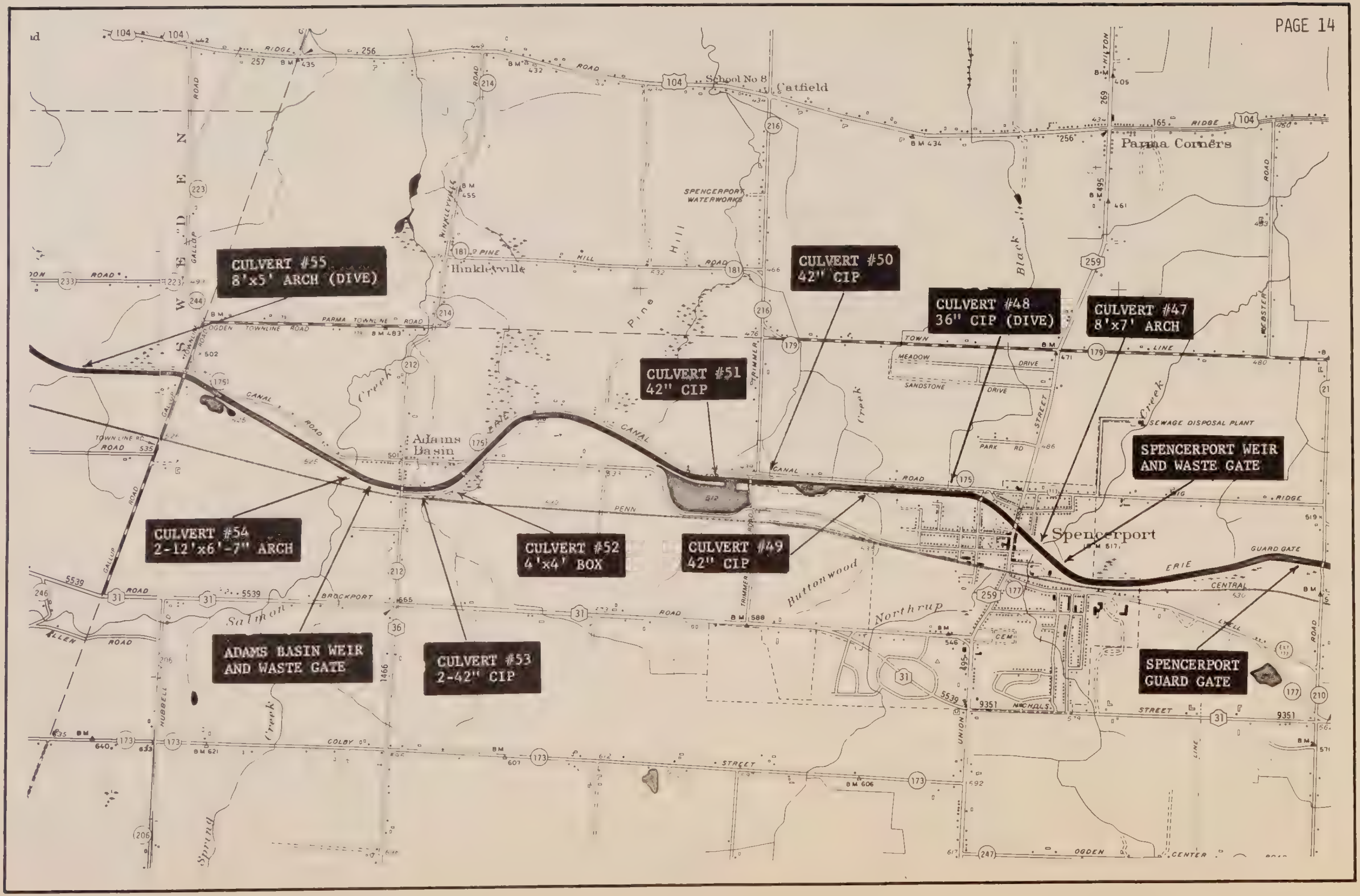
WEATHERING - the phenomenon which causes concrete disintegration resulting from exposure to the atmospheric elements.

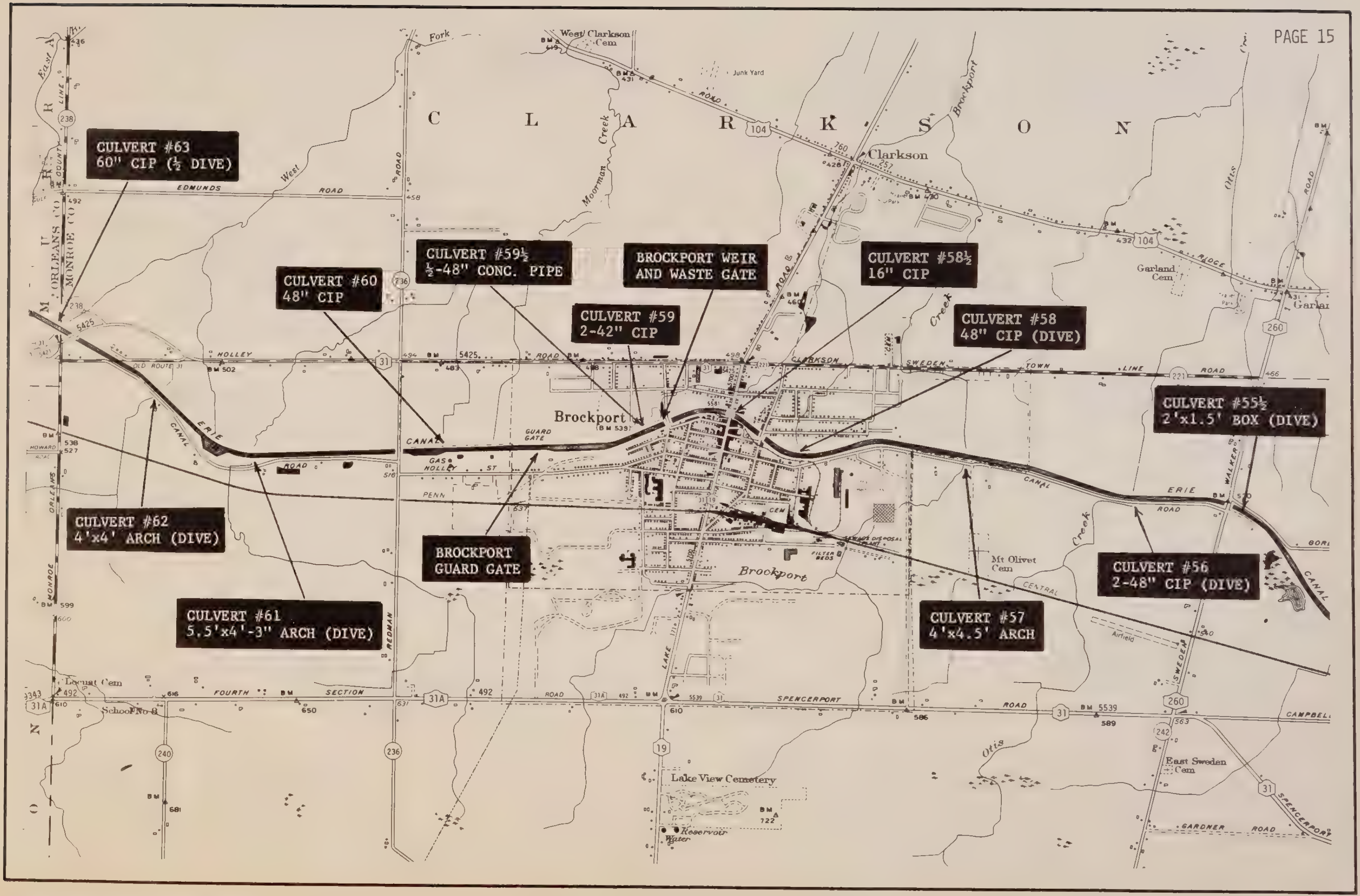

STRUCTURE LOCATIONS
FAIRPORT WEIR
AND WASTE GATE
CULVERT #27
30" CIP (DIVE)
CULVERT #26
5-48" CIP (DIVE)
CULVERT #28
2-36" CIP
Fairport
Hannans Corner
Wayneport
MONROE CO
WAYNE CO
School No 8
School No 3
School No 4
Union Cem
Trailer Park
KNAPPS BRIDGE
WHITNEY ROAD
CENTER ROAD
BUDLONG ROAD
QUAKER ROAD
AYRAULT ROAD
ERIE
OLD RAILROAD GRADE
SCALE 1 24 000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

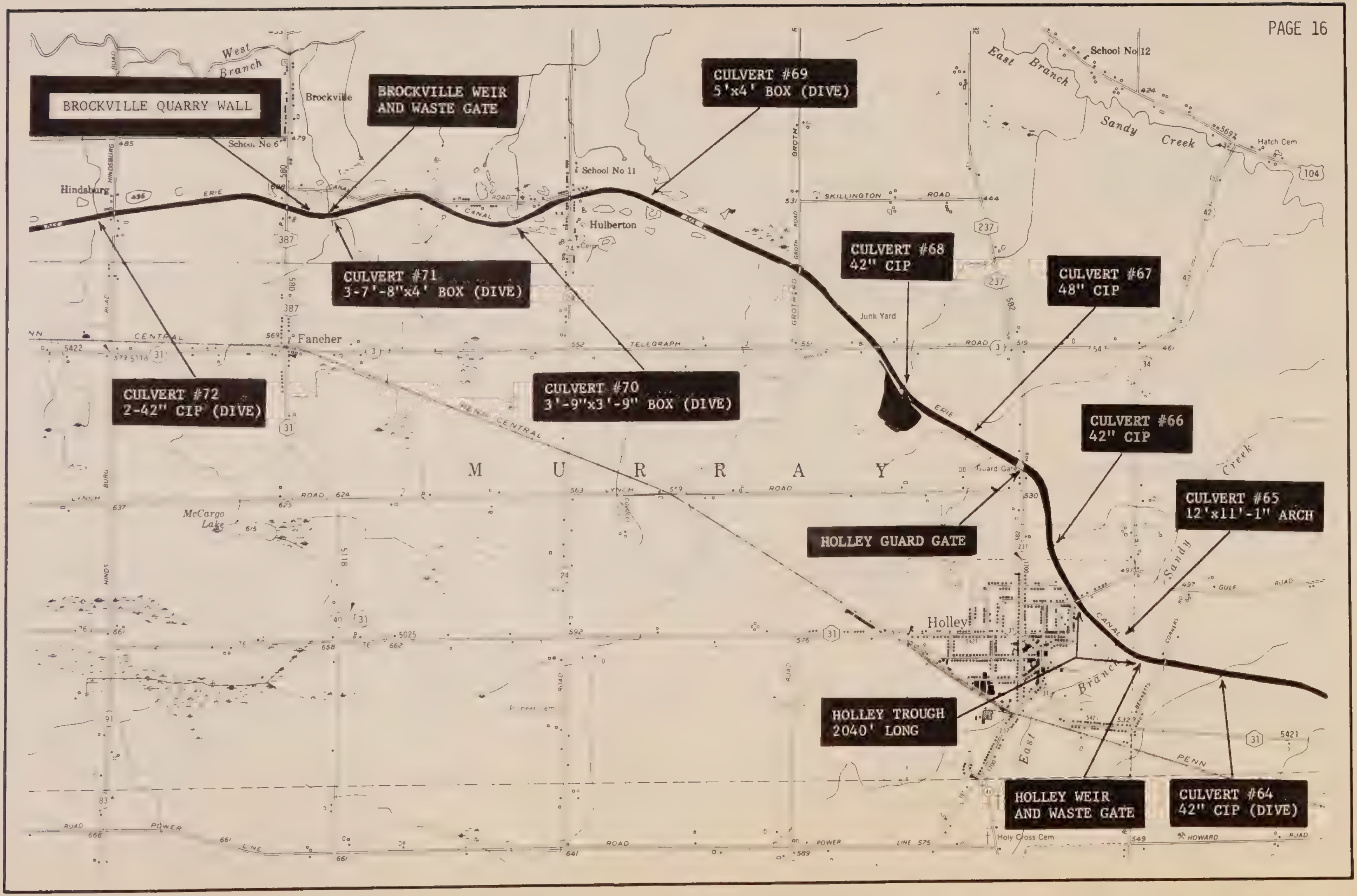

LOCK 33
LOCK 32
CULVERT #34
42" CIP (DIVE)
CULVERT #33
8'x8' BOX (DIVE)
CULVERT #31
42" CIP (DIVE)
CARTERSVILLE GUARD GATE,
WEIR AND WASTE GATE
CONCRETE PRISM
LINING - 2645' LONG
BUSHNELL BASIN
WASTE GATE
BUSHNELL BASIN
TROUGH - 1025' LONG
BUSHNELL BASIN
RETAINING WALL
468' LONG
CULVERT #30½
2'x2' BOX
IRONDEQUOIT
TROUGH - 4185' LONG
CULVERT #30
2-12'x9' BOX
CONCRETE PRISM
LINING - 2985' LONG
CULVERT #29
84" CONC. PIPE
BUSHNELL BASIN
GUARD GATE
Pittsford
PITTSFORD
Locust Hill
Country Club
Monroe Golf Club
WHITE HAVEN
MEMORIAL PARK
CEMETERY
NAZARETH
CONVENT AND
NORMAL SCHOOL
Bushnell Basin
CARTERSVILLE
GUARD GATE


COURT STREET DAM
WEST GUARD LOCK
EAST GUARD LOCK
CULVERT #35
2-8'x6' BOX
GENESEE RIVER
ROCHESTER
BRIGHTON
West Brighton
Westfall
Crittenden
Mortimer
School No 4
Rochester Airport
Genesee Valley Park
UNIVERSITY OF ROCHESTER
STATE HOSPITAL
IOLA SANITARIUM
Allen Creek
Red Creek
Black Creek

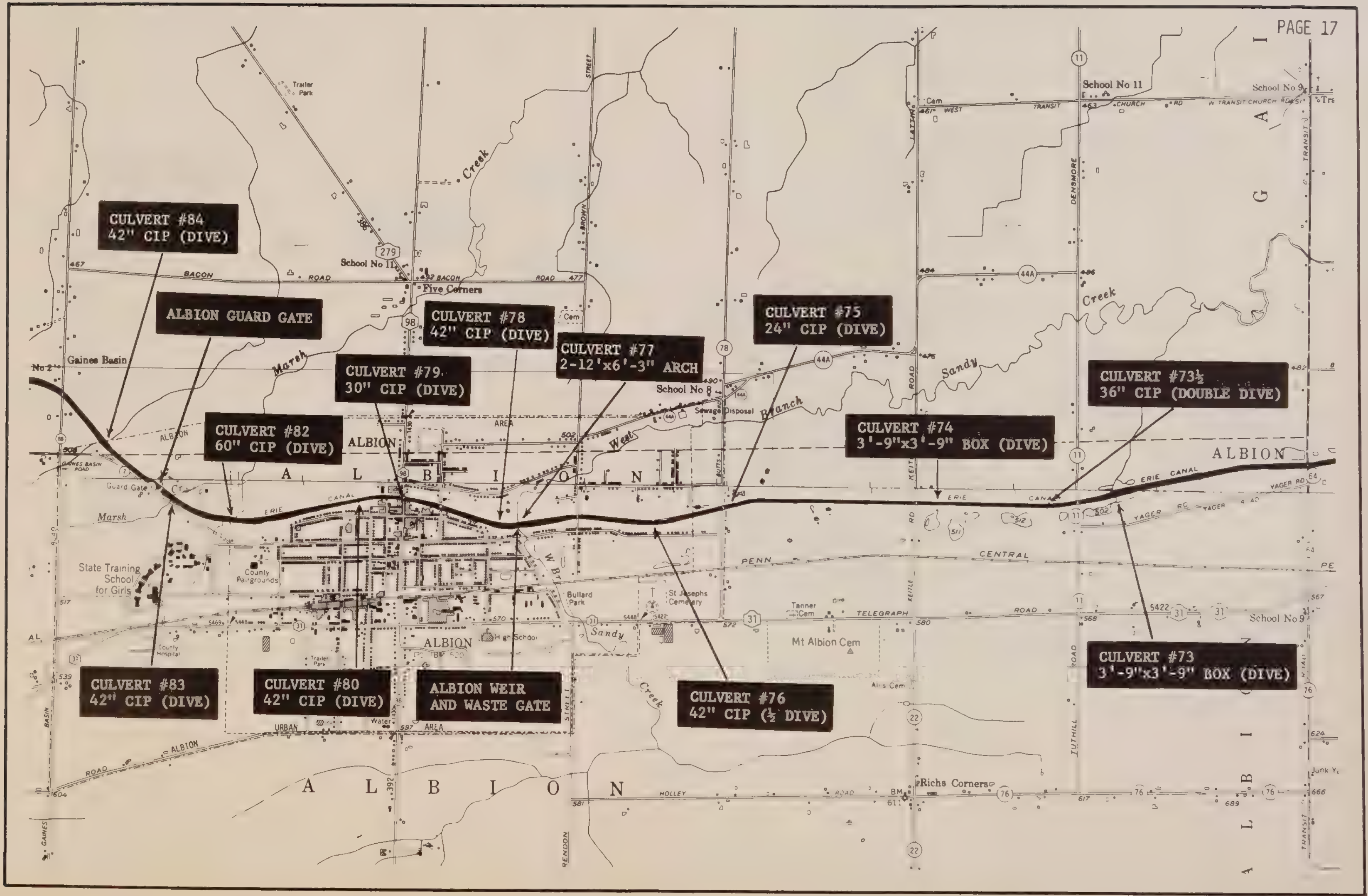

CULVERT #44
42" CIP
GREECE WEIR (ABANDONED)
AND WASTE GATE
CULVERT #45
48" CIP
CULVERT #46
5.5'x4' ARCH
CULVERT #43
4'x3'-3" ARCH (DIVE)

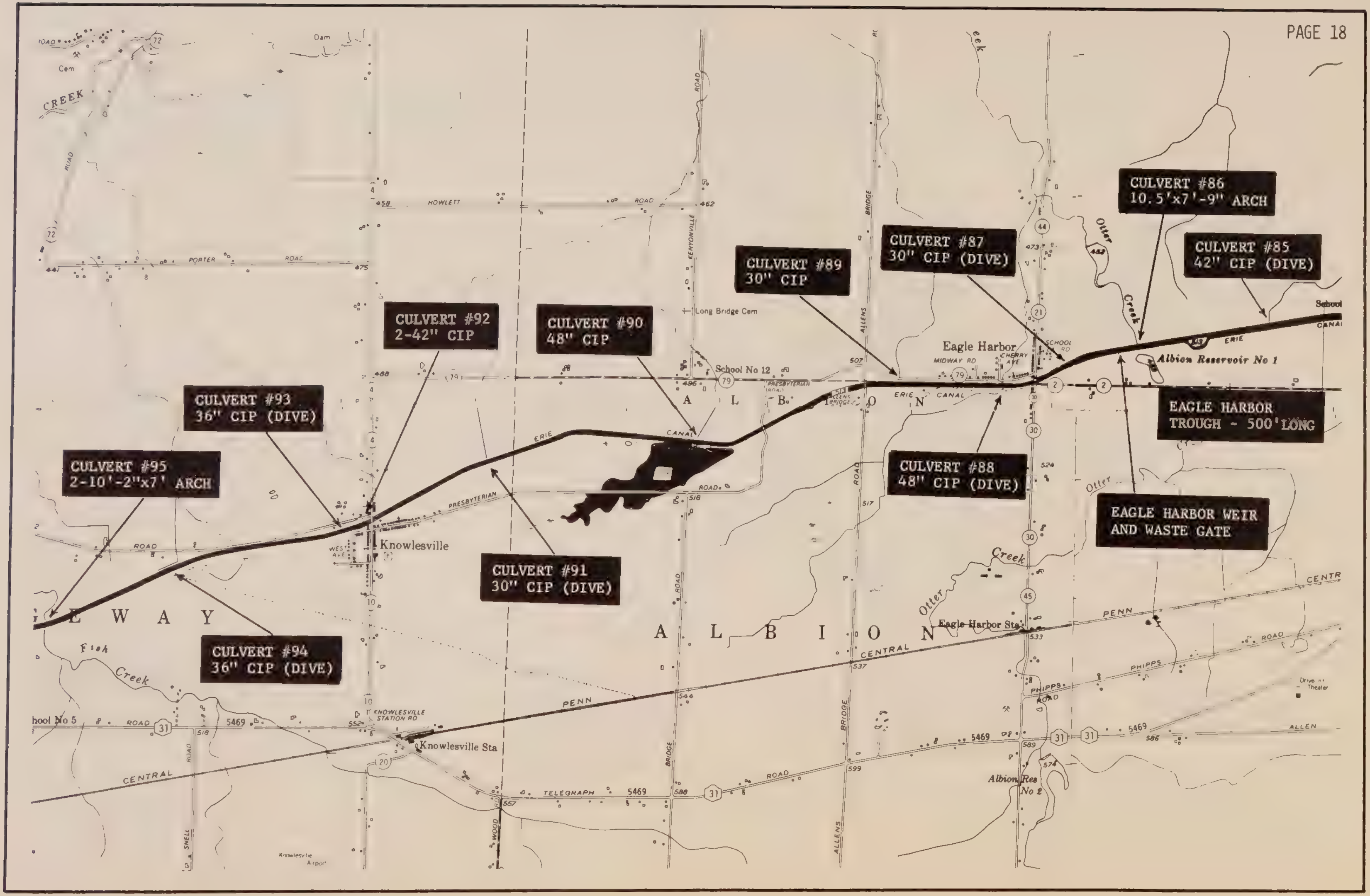

CULVERT #55
8'x5' ARCH (DIVE)
CULVERT #50
42" CIP
CULVERT #48
36" CIP (DIVE)
CULVERT #47
8'x7' ARCH
CULVERT #51
42" CIP
SPENCERPORT WEIR
AND WASTE GATE
CULVERT #54
2-12'x6'-7" ARCH
CULVERT #52
4'x4' BOX
CULVERT #49
42" CIP
ADAMS BASIN WEIR
AND WASTE GATE
CULVERT #53
2-42" CIP
SPENCERPORT
GUARD GATE
Adams Basin
Spencerport
Parma Corners
Catfield
School No 8
Hinkleyville
SPENCERPORT WATERWORKS
SEWAGE DISPOSAL PLANT
CANAL ROAD
RIDGE ROAD
COLBY STREET
NICHOLS STREET
OGDEN CENTER ROAD
PARMA TOWNLINE ROAD
OGDEN TOWNLINE ROAD
BROCKPORT ROAD
ERIE
CENTRAL
PENN
GUARD GATE
Salmon
Buttonwood
Northrup
Black
Creek
Spring
Creek
Pine Hill
TRIMMER ROAD
UNION STREET
GALLUP ROAD
HUBBELL
WEBSTER
HILTON
MEADOW DRIVE
SANDSTONE DRIVE
PARK RD
TOWN LINE
ALLEN ROAD
HINKLEYVILLE
CEM
W E S T

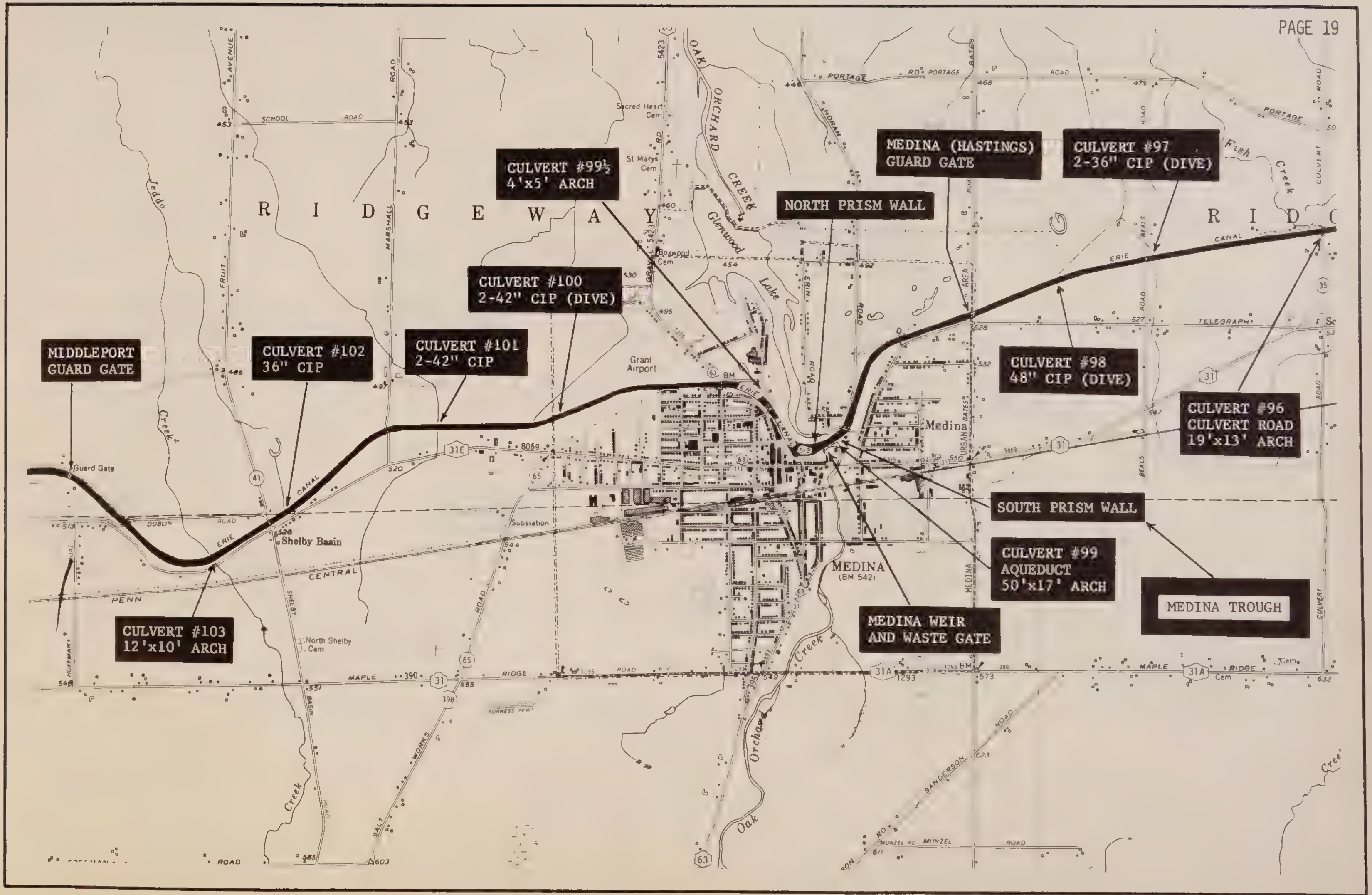

CULVERT #63
60" CIP (½ DIVE)
CULVERT #60
48" CIP
CULVERT #59½
½-48" CONC. PIPE
BROCKPORT WEIR
AND WASTE GATE
CULVERT #58½
16" CIP
CULVERT #59
2-42" CIP
CULVERT #58
48" CIP (DIVE)
CULVERT #55½
2'x1.5' BOX (DIVE)
CULVERT #62
4'x4' ARCH (DIVE)
BROCKPORT
GUARD GATE
CULVERT #56
2-48" CIP (DIVE)
CULVERT #61
5.5'x4'-3" ARCH (DIVE)
CULVERT #57
4'x4.5' ARCH
C L A R K S O N
Clarkson
Brockport
West Clarkson Cem
Junk Yard
Garland Cem
Mt Olivet Cem
Lake View Cemetery
East Sweden Cem
Locust Cem
School No 8
ERIE CANAL
GUARD GATE
EDMUNDS ROAD
HOLLEY ROAD
FOURTH SECTION ROAD
SPENCERPORT ROAD
GARDNER ROAD
Airfield
Reservoir
ORLEANS CO.
MONROE CO.

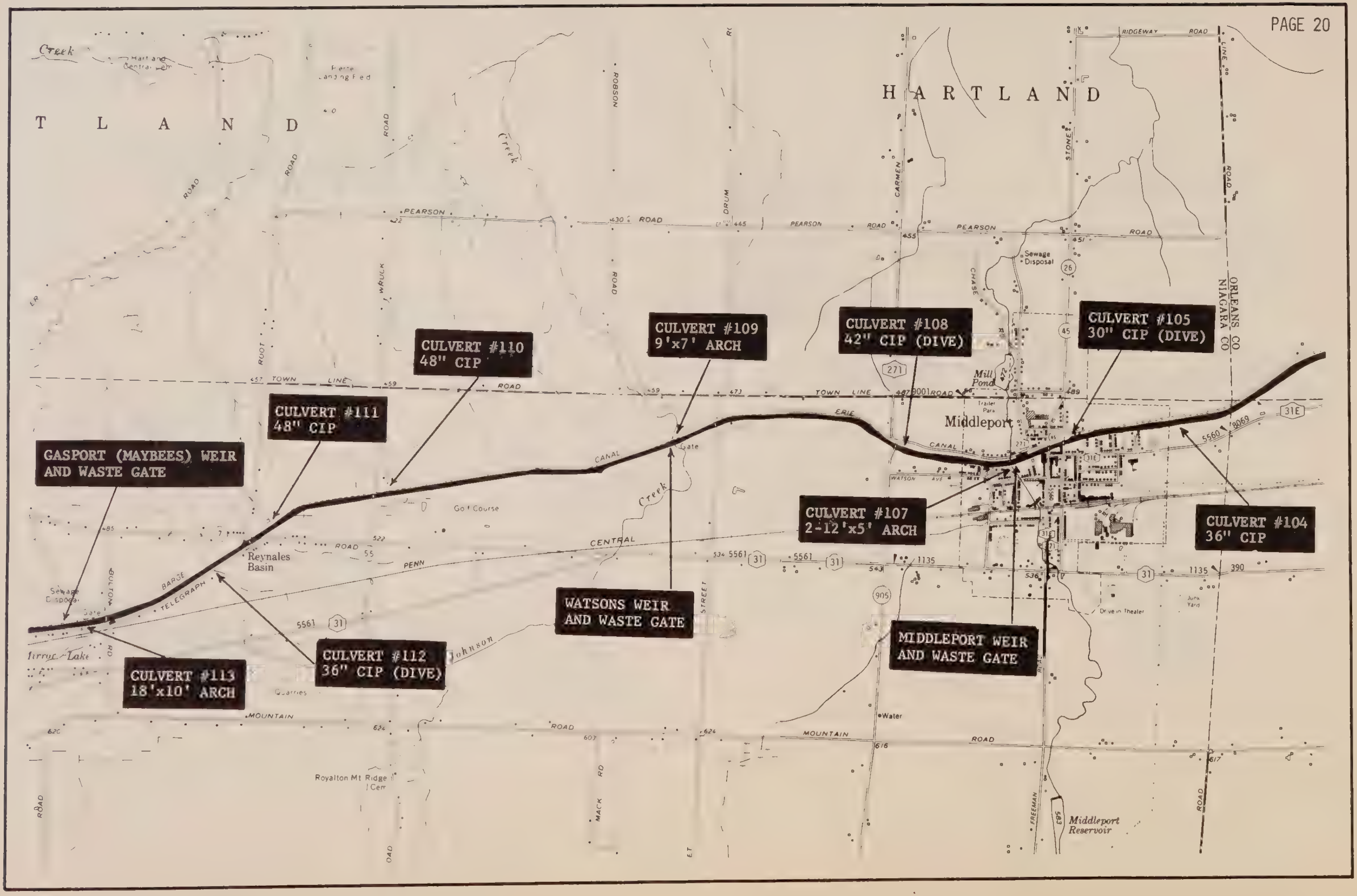


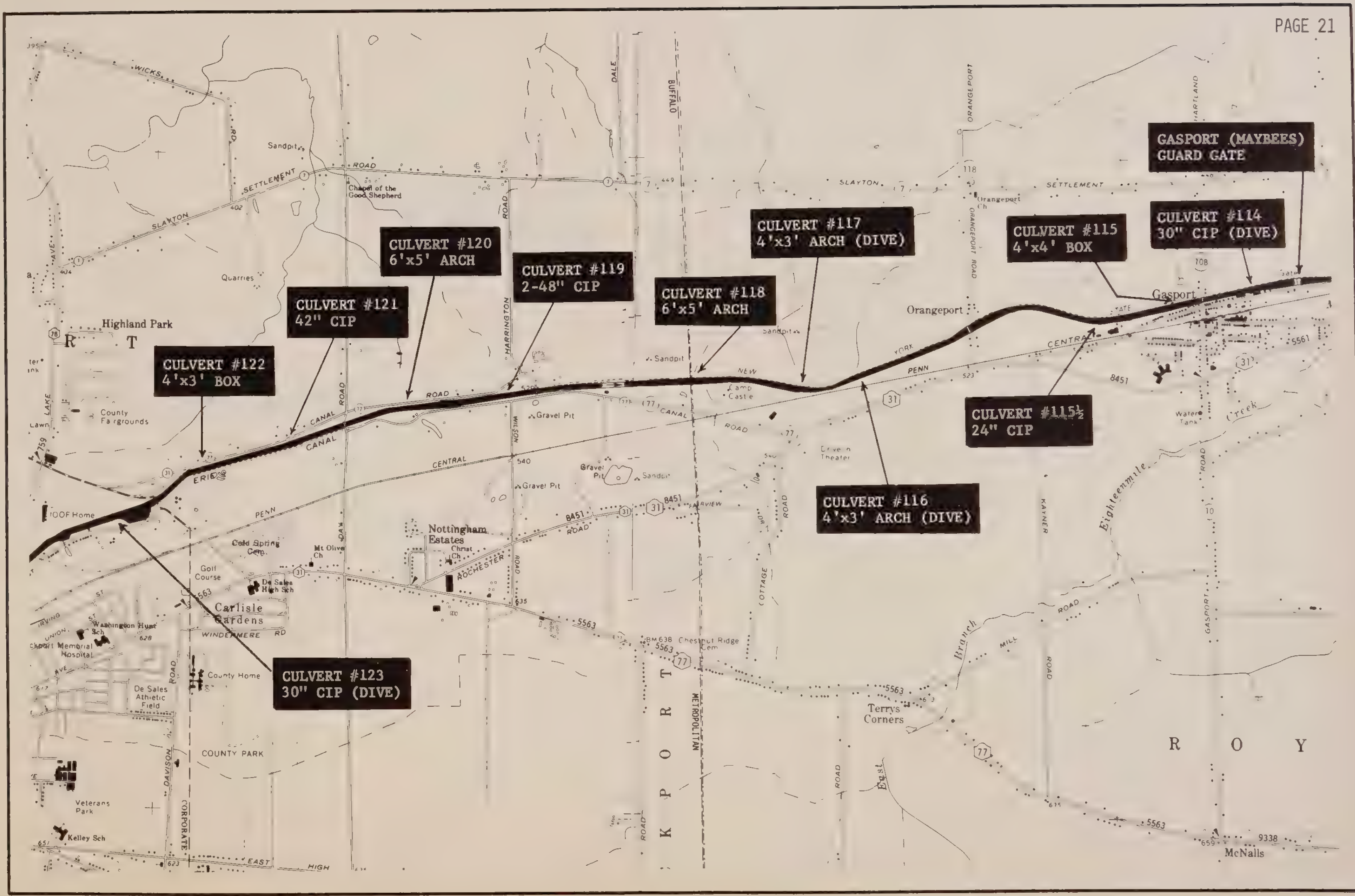
BROCKVILLE QUARRY WALL
BROCKVILLE WEIR AND WASTE GATE
CULVERT #69 5'x4' BOX (DIVE)
CULVERT #68 42" CIP
CULVERT #67 48" CIP
CULVERT #66 42" CIP
CULVERT #65 12'x11'-1" ARCH
CULVERT #64 42" CIP (DIVE)
HOLLEY WEIR AND WASTE GATE
HOLLEY TROUGH 2040' LONG
HOLLEY GUARD GATE
CULVERT #70 3'-9"x3'-9" BOX (DIVE)
CULVERT #71 3-7'-8"x4' BOX (DIVE)
CULVERT #72 2-42" CIP (DIVE)
West Branch
Brockville
Hindsburg
Hulberton
Fancher
Holley
M U R R A Y
School No 11
School No 12
East Branch Sandy Creek
Hatch Cem
Junk Yard
McCargo Lake
Holy Cross Cem
ERIE CANAL
SKILLINGTON ROAD
TELEGRAPH ROAD
LYNCH ROAD
POWER LINE ROAD
PENN CENTRAL

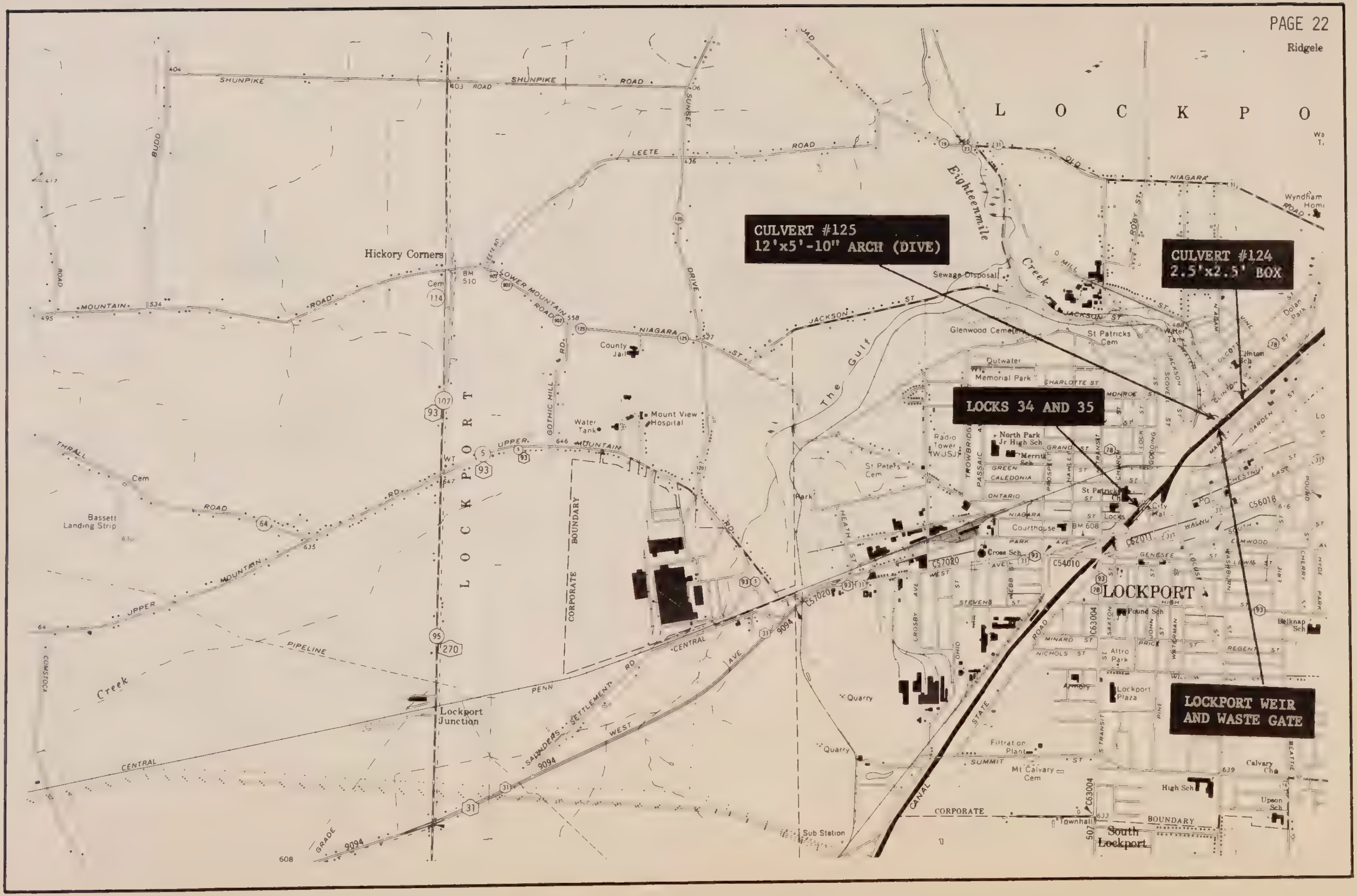

CULVERT #84
42" CIP (DIVE)
ALBION GUARD GATE
CULVERT #78
42" CIP (DIVE)
CULVERT #77
2-12'x6'-3" ARCH
CULVERT #79
30" CIP (DIVE)
CULVERT #75
24" CIP (DIVE)
CULVERT #82
60" CIP (DIVE)
CULVERT #74
3'-9"x3'-9" BOX (DIVE)
CULVERT #73½
36" CIP (DOUBLE DIVE)
CULVERT #83
42" CIP (DIVE)
CULVERT #80
42" CIP (DIVE)
ALBION WEIR
AND WASTE GATE
CULVERT #76
42" CIP (½ DIVE)
CULVERT #73
3'-9"x3'-9" BOX (DIVE)
ERIE CANAL
ALBION
Five Corners
Gaines Basin
State Training School for Girls
County Fairgrounds
Mt Albion Cem
Richs Corners


CULVERT #86
10.5'x7'-9" ARCH
CULVERT #85
42" CIP (DIVE)
CULVERT #87
30" CIP (DIVE)
CULVERT #89
30" CIP
CULVERT #92
2-42" CIP
CULVERT #90
48" CIP
CULVERT #93
36" CIP (DIVE)
CULVERT #95
2-10'-2"x7' ARCH
CULVERT #91
30" CIP (DIVE)
CULVERT #94
36" CIP (DIVE)
CULVERT #88
48" CIP (DIVE)
EAGLE HARBOR
TROUGH - 500' LONG
EAGLE HARBOR WEIR
AND WASTE GATE
Eagle Harbor
Albion Reservoir No 1
Knowlesville
Knowlesville Sta
Eagle Harbor Sta
Albion Res No 2
School No 12
Long Bridge Cem
School No 5
ERIE CANAL
A L B I O N
HOWLETT ROAD
PORTER ROAD
PRESBYTERIAN ROAD
TELEGRAPH ROAD
PENN CENTRAL
Otter Creek
Fish Creek


MIDDLEPORT
GUARD GATE
CULVERT #102
36" CIP
CULVERT #101
2-42" CIP
CULVERT #100
2-42" CIP (DIVE)
CULVERT #99½
4'x5' ARCH
NORTH PRISM WALL
MEDINA (HASTINGS)
GUARD GATE
CULVERT #97
2-36" CIP (DIVE)
CULVERT #98
48" CIP (DIVE)
CULVERT #96
CULVERT ROAD
19'x13' ARCH
SOUTH PRISM WALL
CULVERT #99
AQUEDUCT
50'x17' ARCH
MEDINA TROUGH
MEDINA WEIR
AND WASTE GATE
CULVERT #103
12'x10' ARCH
R I D G E W A Y
Guard Gate
Shelby Basin
ERIE CANAL
PENN CENTRAL
Medina
MEDINA
(BM 542)
Grant
Airport
Glenwood Lake
Oak Orchard Creek
North Shelby
Cem
Sacred Heart
Cem
St Marys
Cem
Boxwood
Cem
Substation
Fish Creek

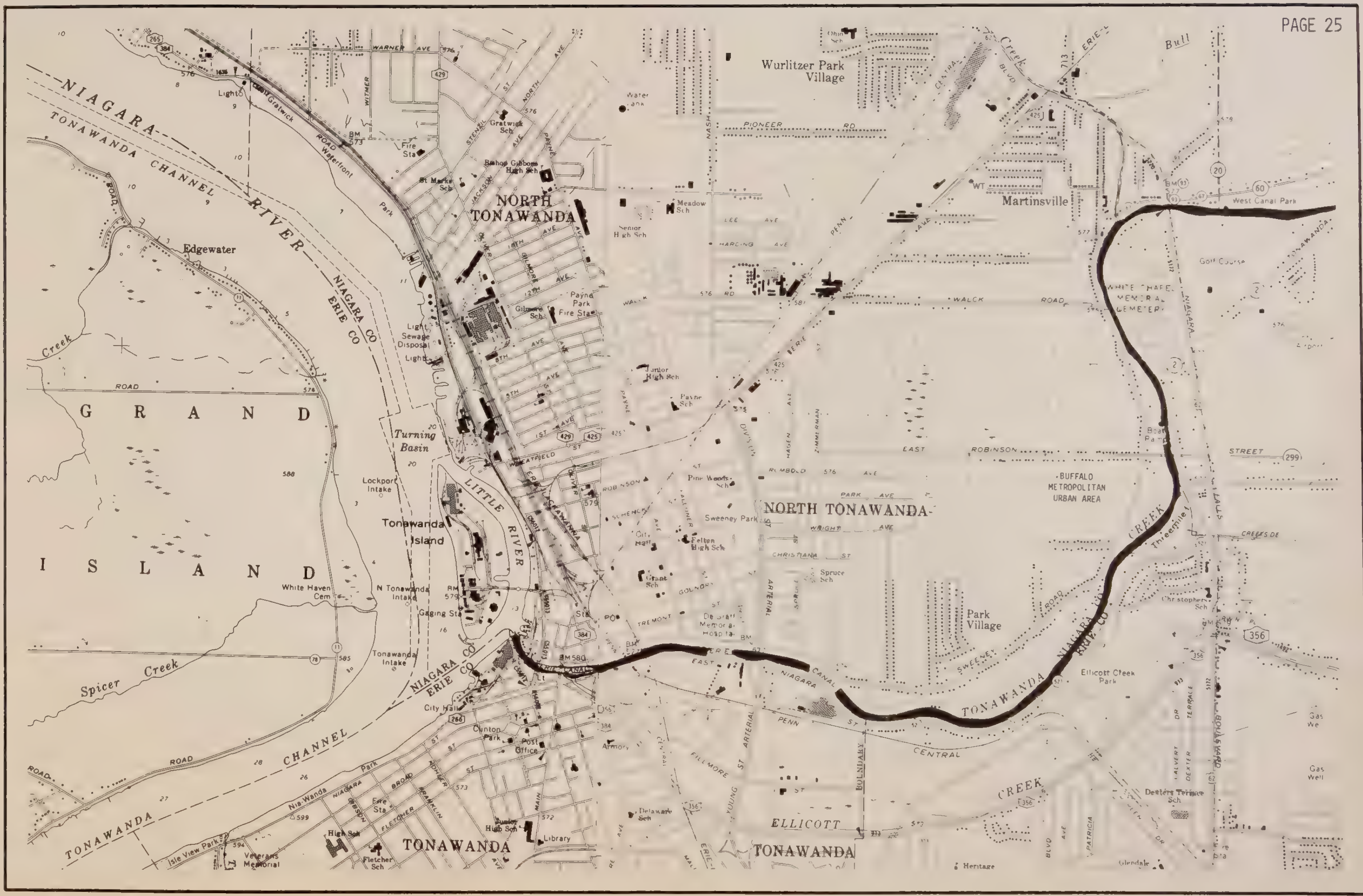

HARTLAND
CULVERT #110
48" CIP
CULVERT #109
9'x7' ARCH
CULVERT #108
42" CIP (DIVE)
CULVERT #105
30" CIP (DIVE)
CULVERT #111
48" CIP
GASPORT (MAYBEES) WEIR
AND WASTE GATE
CULVERT #107
2-12'x5' ARCH
CULVERT #104
36" CIP
WATSONS WEIR
AND WASTE GATE
MIDDLEPORT WEIR
AND WASTE GATE
CULVERT #112
36" CIP (DIVE)
CULVERT #113
18'x10' ARCH
Middleport
Reynales
Basin
Golf Course
ORLEANS CO
NIAGARA CO
Middleport
Reservoir
PEARSON ROAD
MOUNTAIN ROAD
ERIE CANAL
TOWN LINE ROAD


GASPORT (MAYBEES) GUARD GATE
CULVERT #114
30" CIP (DIVE)
CULVERT #115
4'x4' BOX
CULVERT #115½
24" CIP
CULVERT #116
4'x3' ARCH (DIVE)
CULVERT #117
4'x3' ARCH (DIVE)
CULVERT #118
6'x5' ARCH
CULVERT #119
2-48" CIP
CULVERT #120
6'x5' ARCH
CULVERT #121
42" CIP
CULVERT #122
4'x3' BOX
CULVERT #123
30" CIP (DIVE)
Highland Park
County Fairgrounds
IOOF Home
Sandpit
Chapel of the Good Shepherd
Quarries
Gravel Pit
Nottingham Estates
Cold Spring Cem.
Golf Course
De Sales High Sch
Carlisle Gardens
County Home
De Sales Athletic Field
COUNTY PARK
Veterans Park
Kelley Sch
Camp Castle
Drive-in Theater
Chestnut Ridge Cem
Terrys Corners
Orangeport
Gasport
McNalls
Eighteenmile Creek
SETTLEMENT ROAD
SLAYTON SETTLEMENT
WICKS
ERIE CANAL
NEW YORK CENTRAL
PENN CENTRAL
ROCHESTER ROAD
WINDERMERE RD
EAST HIGH
HARRINGTON ROAD
WILSON ROAD
ORANGEPORT ROAD
GASPORT ROAD
COTTAGE ROAD
DAVISON ROAD
METROPOLITAN
BUFFALO
DALE
CORPORATE
R O Y
K P O R T


CULVERT #125
12'x5'-10" ARCH (DIVE)
CULVERT #124
2.5'x2.5' BOX
LOCKS 34 AND 35
LOCKPORT WEIR
AND WASTE GATE
L O C K P O
LOCKPORT
LOCKPORT
Hickory Corners
Lockport Junction
South Lockport
Eighteenmile Creek
The Gulf
County Jail
Mount View Hospital
Glenwood Cemetery
Sewage Disposal
Bassett Landing Strip
CORPORATE BOUNDARY

PENDLETON
GUARD GATE
Comstock Corners
Pendleton Center
Township Park
Donner Landing Strip
Pumping Station
Water Tank
Southard Sch
Transit Airport
P E N D L E T O N
P E N D L E T O N
L E T O N
D L E T O N
HINMAN ROAD
MURPHY ROAD
LOCKPORT ROAD
ROBINSON ROAD
BUFFALO ROAD
DUNNER ROAD
FISK ROAD
FEIGLE RD
RAPIDS ROAD
DUNNIGAN ROAD
SHEETRAM ROAD
MEYER ROAD
RIDGE
BEAR RIDGE ROAD
ERIE-LACKAWANNA
ERIE-LACKAWANNA
RAILROAD
TELEPHONE
PIPELINE
PIPELINE
CAMPBELL BLVD
MAIN ROAD
BOULEVARD
EAST CANAL
WEST CANAL
TRANSIT ROAD
METROPOLITAN
URBAN
SHIMER RD
HAMM RD
OLD BEATTIE RD
BARTZ

Smith
Landing Strip
Bear Ridge
Bear Ridge
Cem
Pendleton
Air Park
ROAD
OAKWOOD DRIVE
Substation
OAKWOOD DR
Pendleton
NIAGARA
ERIE
CREEK
Good Shepherd Sch
Wendelville
TONAWANDA CREEK
ERIE
CANAL
ROAD
CREEK
TONAWANDA
NIAGARA CO
ERIE CO
ROAD
TONAWANDA
Acacia Park
Cemetery
Sewage
Disposal
Ransom
ORBIT RD
ROAD
Army Reserve Center
Amherst
Airport
Army Reserve Center
SCHOELLS RD
SCHOELLS ROAD
HOPKINS
MILLERSPORT
NEW
Creek
Black
ROAD
A M H E R S T
96
270
263
297
296
186
1949


NIAGARA RIVER
TONAWANDA CHANNEL
GRAND ISLAND
Edgewater
Spicer Creek
NORTH TONAWANDA
Wurlitzer Park Village
Martinsville
West Canal Park
Turning Basin
LITTLE RIVER
Tonawanda Island
NIAGARA CO
ERIE CO
Lockport Intake
N Tonawanda Intake
Tonawanda Intake
White Haven Cem
BUFFALO METROPOLITAN URBAN AREA
Park Village
Sweeney Park
Ellicott Creek Park
TONAWANDA CREEK
ELLICOTT CREEK
TONAWANDA
Library
Veterans Memorial
City Hall
Clinton Park
Post Office
Armory

Guard gates serve only one major function on the Barge Canal. In the event of any emergency, such as a bad leak or embankment failure, they can be lowered to shut down the flow of water.

Between the West Guard Lock at the Genesee River in Rochester, and Locks 34 and 35 at Lockport, 7 guard gates were constructed. This is a distance of 59.6 miles, with the average distance between any pair of structures being approximately 7.5 miles. The maximum distance of 10.1 miles is between the Holley and Albion Guard Gates and the minimum of 4.3 miles is between the Holley and Brockport Guard Gates.

West of Lockport, the canal is in a deep rock cut section where water feeds directly from the Niagara River. Winds blowing across Lake Erie can cause wide fluctuations in the height of the Niagara River. To protect the locks at Lockport, the Pendleton Guard Gate was constructed 4.5 miles west of Lockport or 13 miles east of the river. This gate is approximately twice as high as the normal 14 foot high guard gate.

All 8 guard gates were inspected in the Spring of 1976. The Brockport, Medina and Pendleton Guard Gates appeared in generally good condition with only localized deterioration and required that no cores be taken. Only the east side of the Pendleton Guard Gate could be inspected as water feeding directly from the Niagara River is on the west side. Evaluations of the Albion, Gasport, Holley, Middleport and Spencerport Guard Gates included cores as more extensive deterioration was present.

Nearly all the concrete walls of the guard gates contained deterioration in the top 2-3 feet. Freeze-thaw action has caused scaling, numerous cracks and delaminations, with the upper portions of some walls much more deteriorated than others.

Counterweights in the form of large concrete blocks suspended from cables help to raise and lower the steel gates. Most of these concrete blocks were covered with cracks, and pieces of concrete have begun to fall off. Some counterweights were in very poor condition.

On top of the abutments and center pier are two foot deep pits into which the counterweights are lowered when the gates are all the way up. On nearly all the guard gates, the top 2 feet of the piers and abutments seemed to be delaminated at the pit bottom level.

Sounding the guard gates to locate delaminations revealed that the pier noses on the center piers generally had a much higher percentage of delaminated concrete than the sides.

Of the 8 guard gates, 5 were constructed with concrete containing gravel coarse aggregate. The other 3 (Holley, Middleport and Spencerport) were constructed with concrete containing crushed Medina sandstone coarse aggregate. The concrete containing the Medina sandstone has, in general, deteriorated to a much greater degree than the gravel concrete.

Our recommendations include repairs to the 3 guard gates containing Medina sandstone aggregate in the near future. Two of the others (Albion and Gasport) will require repairs sometime in the future. The 3 guard gates that were not cored (Brockport, Medina and Pendleton) were still in good condition and nothing other than isolated small repairs will possibly be needed for the foreseeable future.

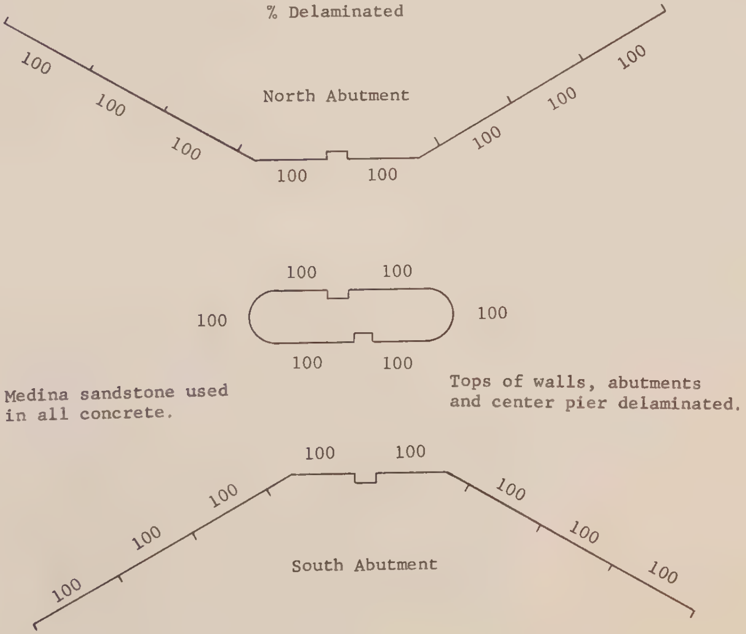
GUARD GATE STRUCTURES

Name	Miles Between	Milepost
Niagara River		492.3
	13.0	
Pendleton Guard Gate		479.3
	4.5	
Lockport Locks		474.8
	7.0	
Gasport Guard Gate		467.8
	6.4	
Middleport Guard Gate		461.4
	4.6	
Medina Guard Gate		456.8
	8.4	
Albion Guard Gate		448.4
	10.1	
Holley Guard Gate		438.3
	4.3	
Brockport		434.0
	9.9	
Spencerport Guard Gate		424.1
	8.9	
West Guard Lock (Genesee River)		415.2

East Guard Lock, Looking West
Genesee River in Distant Background

The purpose of the Genesee River Guard Locks is to allow navigation between the river and the canal while protecting the canal embankments from high river levels.

The Spencerport Guard Gate is located 1.6 miles east of Spencerport. On April 28, 1976, this structure was inspected, sounded for delaminations and 2 cores were taken from the south abutment. On April 26, 1977, a core was also obtained from the north abutment.



Looking West
Spencerport Guard Gate

South Abutment and West End Center Pier
Spencerport Guard Gate

The south abutment was extensively delaminated and severely scaled. Cores #1 and 2, taken near the bottom of the abutment, showed that deterioration extended over 2½ feet into the wall. The lower section of Core #2 contained 1 or 2 small fractures and had a compressive strength of 2485 p.s.i.

The north abutment appeared to be in much better condition than the south abutment. There were no severe scale areas and the walls did not sound as delaminated. However, Core #3 showed that deteriorated concrete extends over 2 feet into the wall.

Both ends of the center pier were beginning to show signs of scaling and many cracks were observed along the sides. It appeared that all sides of the center pier contained deteriorated concrete.

Deterioration was noted along the top of all concrete walls and the center pier. Numerous cracks, scaling and delaminations indicate that the top 2 - 3 feet have been seriously affected.

This structure was built with concrete containing crushed Medina sandstone as the coarse aggregate. Concrete deterioration in those few structures containing Medina sandstone has been generally found to be much more extensive and deeper than those containing gravel aggregates.

North Abutment and West End Center Pier
Spencerport Guard Gate

North Abutment and East End Center Pier
Spencerport Guard Gate

CONCLUSION

The concrete in the south abutment contained fractures which extend halfway or more into most of the walls. Center pier and north abutment concrete deterioration appears to be less, but also extensive.

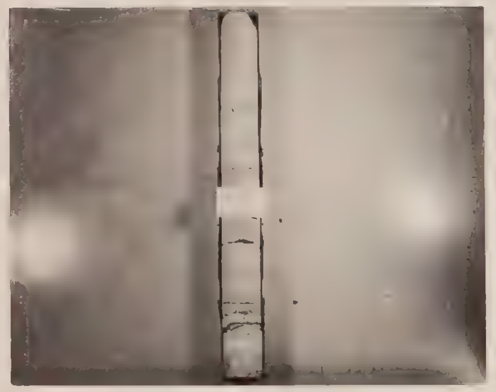
Required repairs include replacement of the top 2 - 3 feet of concrete on the walls and pier, and complete replacement or very extensive repair to the south abutment. Also, over 2 foot deep repairs are needed on the north abutment and on the sides of the center pier. Because of extensive deterioration in the south abutment, repairs to this structure are recommended now.

East End Center Pier
Spencerport Guard Gate

North Abutment
Spencerport Guard Gate

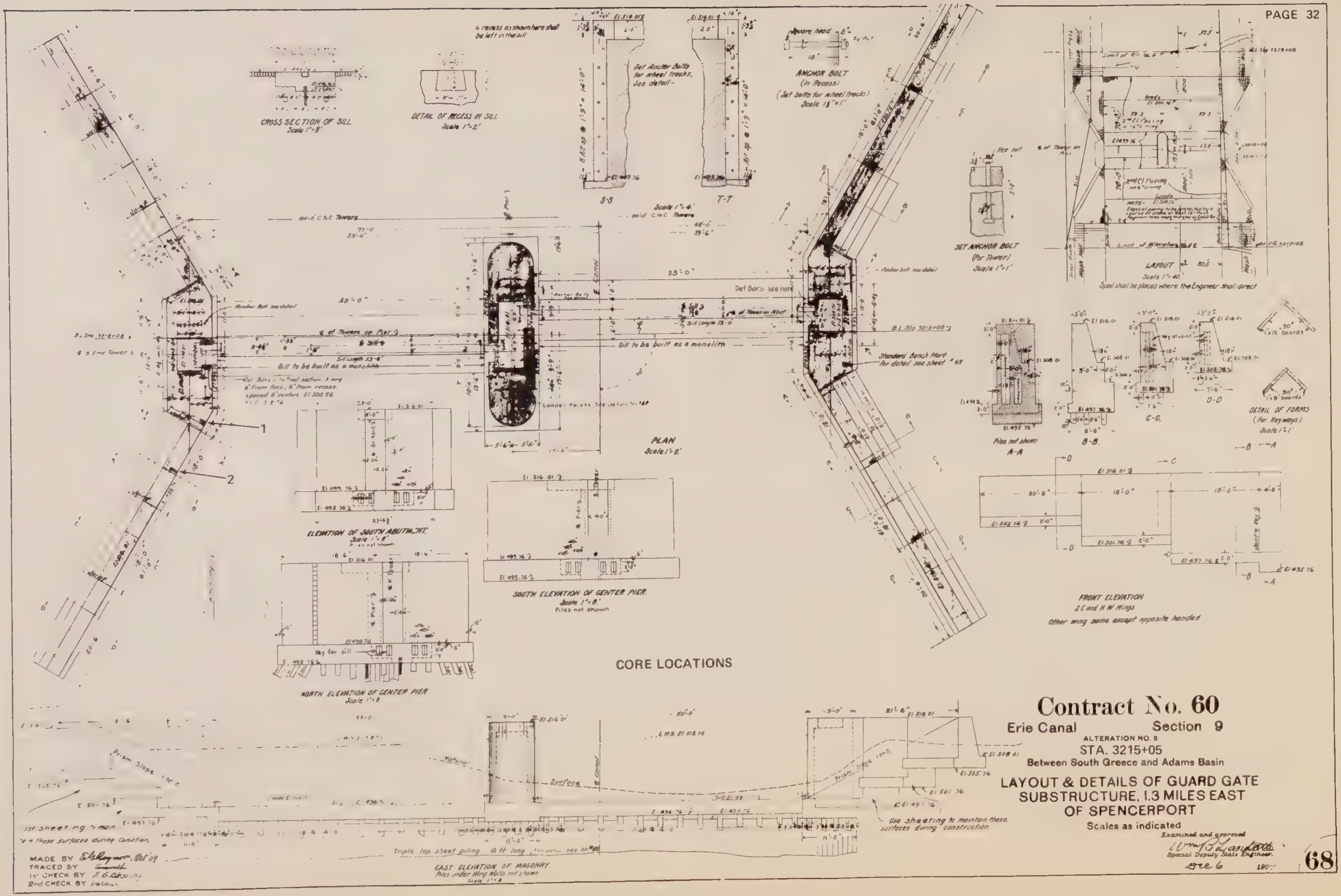
South Abutment
Spencerport Guard Gate

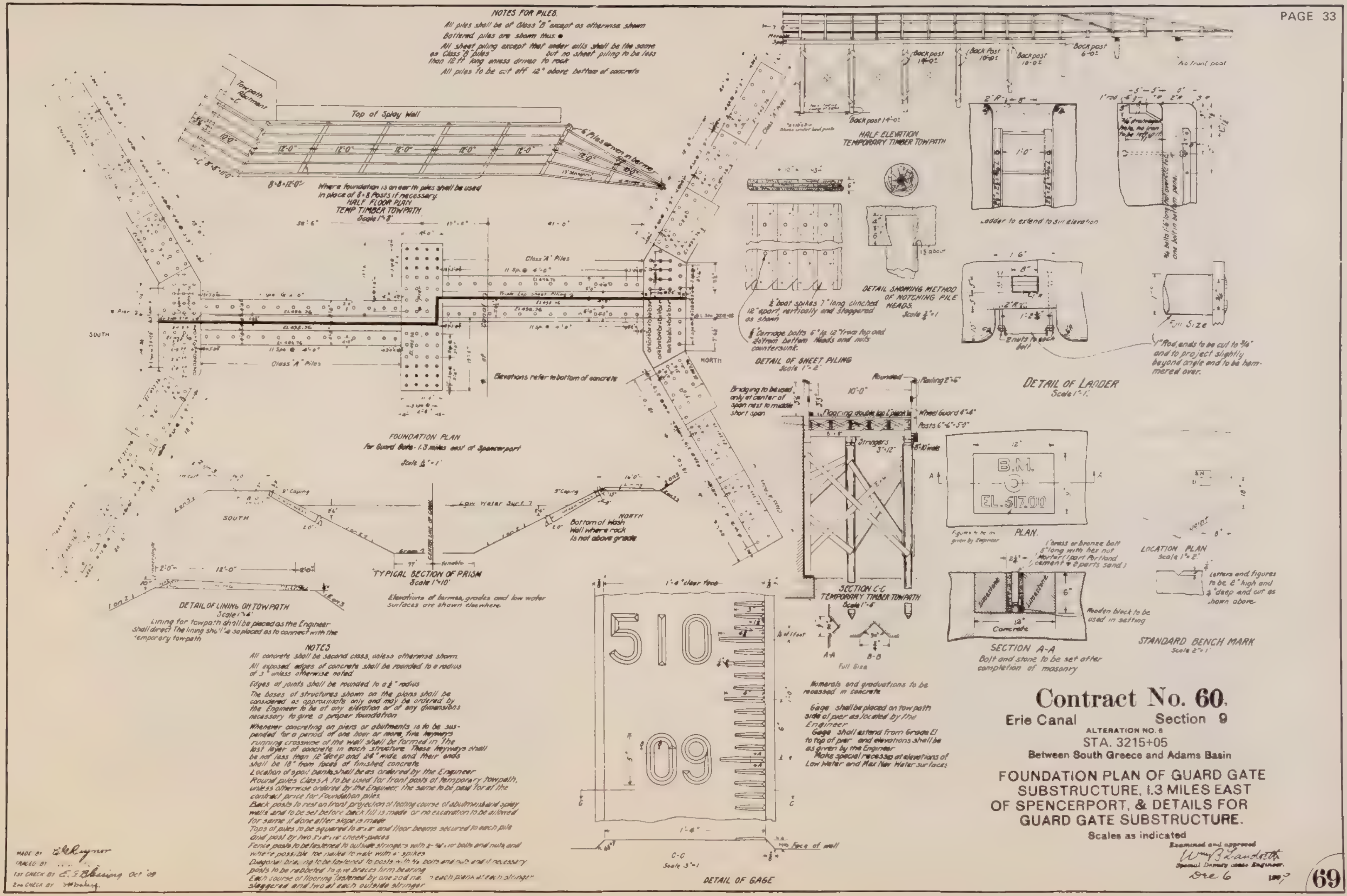
West End Center Pier
Spencerport Guard Gate



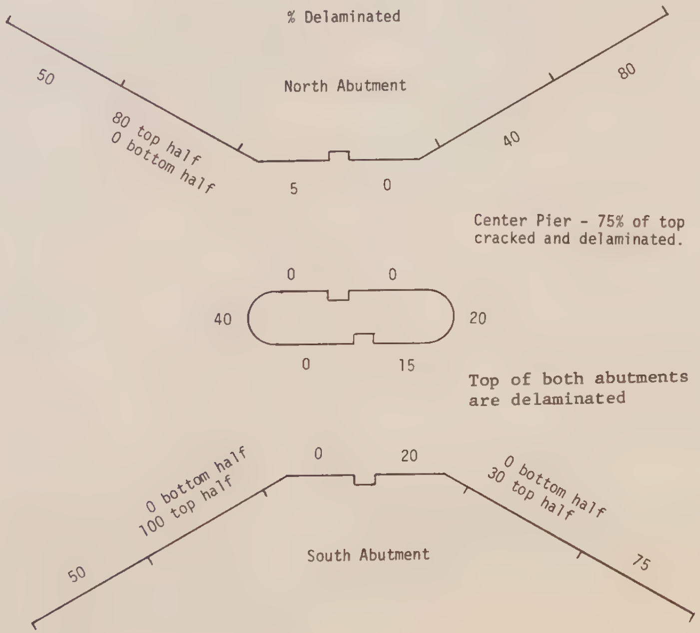
SPENCERPORT GUARD GATE

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	South Abutment, 1½' From Joint With East Splay Wall, 3' Above Bottom	0	26½"	0	26½"	26½"	Very hollow sounding. Core next to 1' deep scale area. Deeper deterioration exists.
2	South Abutment, East Splay Wall, 10' From Joint With Abutment, 3' From Bottom	0	30"	0	30"	30"	Slightly hollow sounding. Typical wall area. Deeper deterioration exists.
3	North Abutment, Middle of West Splay Wall Next to Abutment, 3' From Bottom	0	27"	0	37"	37"	Wall sounds slightly hollow everywhere. Typical wall area.


CROSS SECTION OF SILL
Scale 1"=8'
DETAIL OF RECESS IN SILL
Scale 1"=2'
A recess as shown here shall be left in the sill
Set Anchor Bolts for wheel tracks. See detail-
S-S
T-T
Scale 1"=4'
ANCHOR BOLT
(In Recess)
(Set bolts for wheel tracks)
Square head
SET ANCHOR BOLT
(For Tower)
Hex nut
LAYOUT
Scale 1"=40'
Spoil shall be placed where the Engineer shall direct
2nd Cl Paving
Grade
Limit of Alteration
Sill to be built as a monolith
Sill Length 53'-0"
Def Bars see note
53'-0"
B.L. Sta 3218+08
Standard Bench Mark for detail see sheet #69
Ladder Recess See detail Sh. #69
PLAN
Scale 1"=8'
1
2
A-A
Piles not shown
B-B
C-C
D-D
DETAIL OF FORMS
(For Keyways)
Scale 1"=1'
ELEVATION OF SOUTH ABUTMENT
Scale 1"=8'
SOUTH ELEVATION OF CENTER PIER
Scale 1"=8'
Piles not shown
NORTH ELEVATION OF CENTER PIER
Scale 1"=8
Key for sill
FRONT ELEVATION
S.E. and N.W. Wings
Other wing same except opposite handed
CORE LOCATIONS
Prism Slope 1 on 2
Natural Surface
Use sheeting to maintain these surfaces during construction
Triple lap sheet piling 18 ft long
EAST ELEVATION OF MASONRY
Piles under Wing Walls not shown
Scale 1"=8
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
Contract No. 60
Erie Canal
Section 9
ALTERATION NO. 8
STA. 3215+05
Between South Greece and Adams Basin
LAYOUT & DETAILS OF GUARD GATE SUBSTRUCTURE, 1.3 MILES EAST OF SPENCERPORT
Scales as indicated
Examined and approved
Special Deputy State Engineer.
68


NOTES FOR PILES.
All piles shall be of Class "B" except as otherwise shown
Battered piles are shown thus: ●
All sheet piling except that under sills shall be the same as Class "B" piles but no sheet piling to be less than 12 ft long unless driven to rock
All piles to be cut off 12" above bottom of concrete
Top of Splay Wall
6 Piles driven in berme
Where foundation is on earth piles shall be used in place of 8×8 Posts if necessary.
HALF FLOOR PLAN
TEMP. TIMBER TOWPATH
Scale 1"=8'
HALF ELEVATION
TEMPORARY TIMBER TOWPATH
Class "A" Piles
SOUTH
NORTH
Elevations refer to bottom of concrete
FOUNDATION PLAN
For Guard Gate - 1.3 miles east of Spencerport
DETAIL SHOWING METHOD OF NOTCHING PILE HEADS.
DETAIL OF SHEET PILING
Ladder to extend to sill elevation
DETAIL OF LADDER
Scale 1"=1'
TYPICAL SECTION OF PRISM
Scale 1"=10'
Elevations of bermes, grades and low water surfaces are shown elsewhere
Bottom of Wash Wall where rock is not above grade
DETAIL OF LINING ON TOWPATH
Scale 1"=4'
Lining for towpath shall be placed as the Engineer shall direct. The lining shall be so placed as to connect with the temporary towpath
SECTION C-C
TEMPORARY TIMBER TOWPATH
B.M.
EL. 517.010
PLAN.
SECTION A-A
Bolt and stone to be set after completion of masonry
LOCATION PLAN
STANDARD BENCH MARK
510
09
DETAIL OF GAGE
Numerals and graduations to be recessed in concrete
Gage shall be placed on towpath side of pier as located by the Engineer
Gage shall extend from Grade El to top of pier and elevations shall be as given by the Engineer
Make special recesses at elevations of Low Water and Max Nav Water surfaces
NOTES
All concrete shall be second class, unless otherwise shown.
All exposed edges of concrete shall be rounded to a radius of 3" unless otherwise noted
Edges of joints shall be rounded to a ½" radius
The bases of structures shown on the plans shall be considered as approximate only and may be ordered by the Engineer to be of any elevation or of any dimensions necessary to give a proper foundation
Whenever concreting on piers or abutments is to be suspended for a period of one hour or more, five keyways running crosswise of the wall shall be formed in the last layer of concrete in each structure. These keyways shall be not less than 12" deep and 24" wide and their ends shall be 18" from faces of finished concrete
Location of spoil banks shall be as ordered by the Engineer
Round piles Class A to be used for front posts of temporary towpath, unless otherwise ordered by the Engineer, the same to be paid for at the contract price for Foundation piles.
Back posts to rest on front projection of footing course of abutments and splay walls and to be set before back fill is made or no excavation to be allowed for same if done after slope is made
Tops of piles to be squared to 8×8 and floor beams secured to each pile and post by two 3×8×16 cheek-pieces
Fence posts to be fastened to outside stringers with 2-¾×10 bolts and nuts and where possible toe nailed to wale with 6" spikes
Diagonal bracing to be fastened to posts with ¾ bolts and nuts and if necessary posts to be rebbeted to give braces firm bearing
Each course of flooring fastened by one 20d nail in each plank at each stringer staggered and two at each outside stringer
Contract No. 60.
Erie Canal Section 9
ALTERATION NO. 6
STA. 3215+05
Between South Greece and Adams Basin
FOUNDATION PLAN OF GUARD GATE SUBSTRUCTURE, 1.3 MILES EAST OF SPENCERPORT, & DETAILS FOR GUARD GATE SUBSTRUCTURE.
Scales as indicated
Examined and approved
Special Deputy State Engineer.
69

The Brockport Guard Gate is located 1 mile west of downtown Brockport. On March 31, 1976, this structure was visually inspected and sounded for delaminations. Due to the lack of any large areas of visual deterioration, no cores were taken from this structure.



Looking West
Brockport Guard Gate

North Abutment
Brockport Guard Gate

Except for the top portions of all walls, the majority of delaminated concrete was found in the splaywalls on both sides of the abutments. Some scaling has occurred on these walls below the waterline, but all wall faces appeared in generally good condition. The abutments sounded in especially good condition with very little delaminated concrete.

The center pier also contained little delaminated concrete, except for the pier noses. Both noses contained a much higher percentage of delaminated concrete than the sides, but all faces still appeared in good condition.

North Side Center Pier
Brockport Guard Gate

East Half South Abutment
Brockport Guard Gate

West Half South Abutment
Brockport Guard Gate

The most prevalent concrete deterioration on the structure has occurred to the top 2-3 feet above the waterline. Freeze-thaw action in this area has caused numerous cracks, scaling and delaminations. However, the concrete is still generally intact and will probably remain so for many years.

South Side Center Pier, West End
Brockport Guard Gate

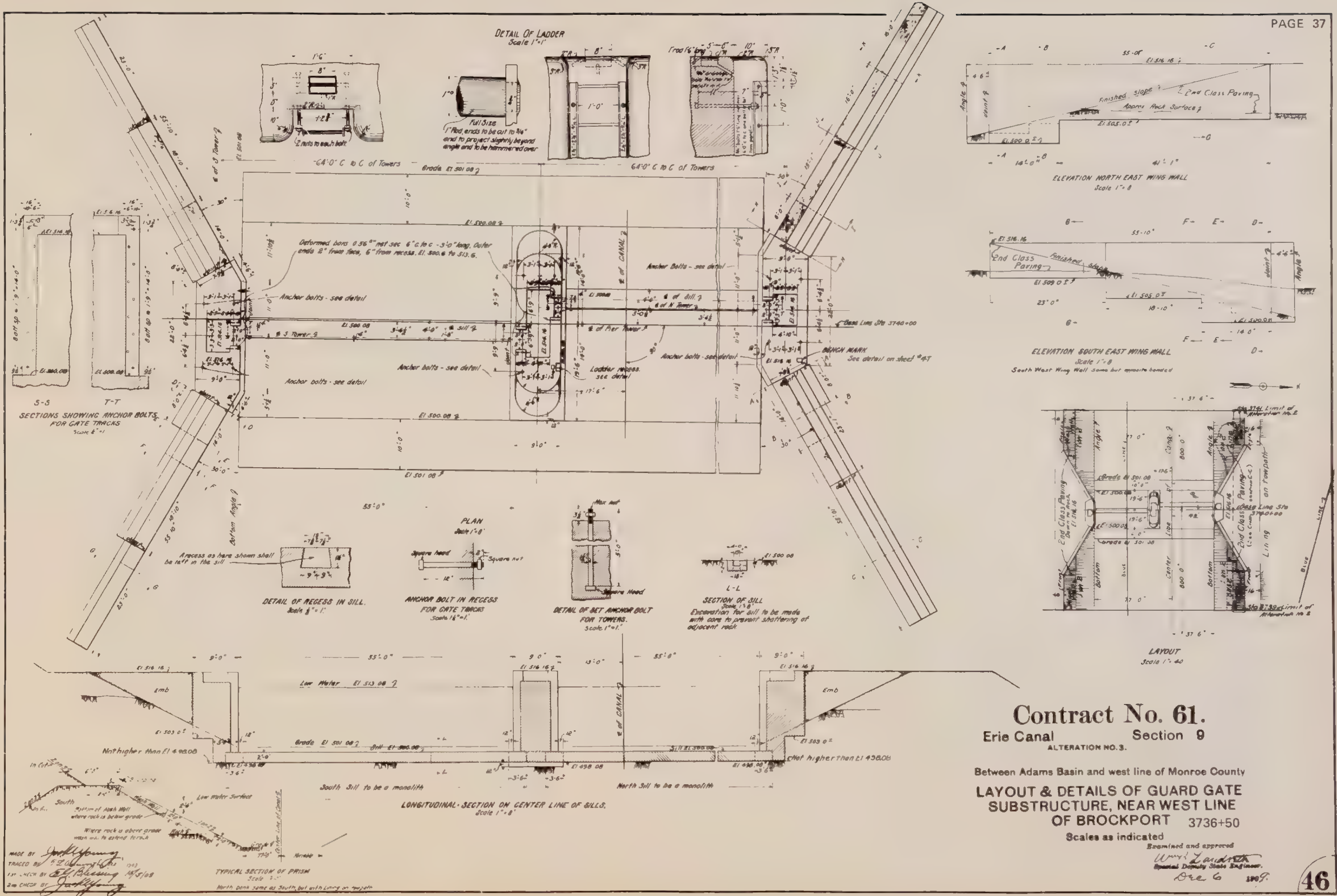
Conclusion

During sounding, many sections of the structure did not seem to contain delaminated concrete. However, cores from other structures showed that very tight fractures can exist in these sections and not be detected by sounding.

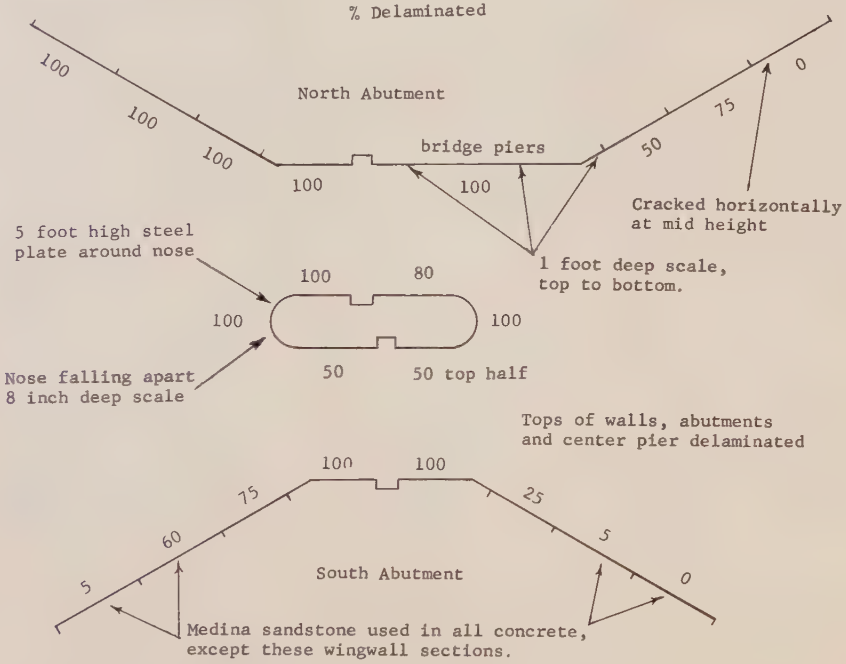
Future repairs to this structure should include replacement of the concrete in the top 2-3 feet of the walls and pier. Also, all sections of the walls and pier faces which contain delaminated concrete should be repaired by removing the concrete to an approximate depth of 8-12 inches and bonding on a new concrete surface.

South Side Center Pier, East End
Brockport Guard Gate

Overall, the structure is still in relatively good condition and we recommend no immediate concrete repairs.


DETAIL OF LADDER
Scale 1"=1'
Full Size
64'0" C to C of Towers
Grade El 501 08
ELEVATION NORTH EAST WING WALL
Scale 1"=8
2nd Class Paving
Finished slope
ELEVATION SOUTH EAST WING WALL
Scale 1"=8
Anchor bolts - see detail
Ladder recess, see detail
Base Line Sta 3740+00
BENCH MARK
S-S
T-T
SECTIONS SHOWING ANCHOR BOLTS FOR GATE TRACKS
PLAN
DETAIL OF RECESS IN SILL.
ANCHOR BOLT IN RECESS FOR GATE TRACKS
DETAIL OF SET ANCHOR BOLT FOR TOWERS.
SECTION OF SILL
Excavation for sill to be made with care to prevent shattering of adjacent rock.
LAYOUT
Scale 1"=40
Low Water El 513 08
South Sill to be a monolith
North Sill to be a monolith
LONGITUDINAL SECTION ON CENTER LINE OF SILLS.
Scale 1"=8'
TYPICAL SECTION OF PRISM
Contract No. 61.
Erie Canal
Section 9
ALTERATION NO. 3.
Between Adams Basin and west line of Monroe County
LAYOUT & DETAILS OF GUARD GATE SUBSTRUCTURE, NEAR WEST LINE OF BROCKPORT 3736+50
Scales as indicated
Examined and approved
Special Deputy State Engineer.
46

The Holley Guard Gate is located 1 mile north of Holley. On April 9, 1976, this structure was inspected, sounded for delaminations and cored.



As was observed in the majority of guard gates, the upper 2-3 feet of concrete in the center pier and walls contained numerous delaminations, cracks and scaled areas caused by freeze-thaw action.

Looking West
Holley Guard Gate

East Half South Abutment and Center Pier
Holley Guard Gate

The majority of the walls on the entire structure contained extensive delaminations. The north abutment, under the bridge, exhibited areas of scaling 1 foot deep caused by joint leakage. Deep scaling also existed on other areas of the structure. Core #1, taken from under the bridge, contained deterioration 17 inches deep with deeper deterioration existing in adjacent scaled areas.

The west nose of the center pier was disintegrating and a 5 foot high steel plate has been wrapped around the upper end to hold it together. Other areas of the pier were in much better condition. Core #2, taken from a solid sounding area on the north side of the pier, contained deterioration only 6½ inches deep. The lower portion of this core had a compressive strength of 4875 p.s.i. even though it contained 1 or 2 small fractures.

West Half South Abutment and Center Pier
Holley Guard Gate

East Half South Abutment and Center Pier
Holley Guard Gate

West Half North Abutment and Center Pier
Holley Guard Gate

The splaywalls at both ends of the south abutment were in much better condition than the other portions of the abutment. Gravel aggregate was used in the concrete for the splaywalls while crushed Medina sandstone was used as the concrete aggregate in the other portions of the structure.

Concrete deterioration in those few structures containing Medina sandstone has been generally found to be much more extensive and deeper than those containing gravel aggregates.

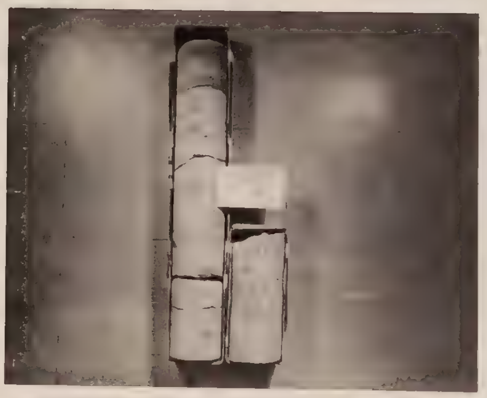
Conclusion

The walls of the north abutment under the bridge contain fractures which extend halfway or more through the walls. Other areas of the abutments and pier also contain deep deterioration. Because of this extensive deterioration, repairs are recommended for the near future.

Recommended repairs include replacement of the concrete in the top 2-3 feet of all walls and pier, and complete replacement or very extensive repair of the north abutment under the bridge. Also, 1-2 foot deep repairs are required in the other areas of delaminated or scaled concrete.

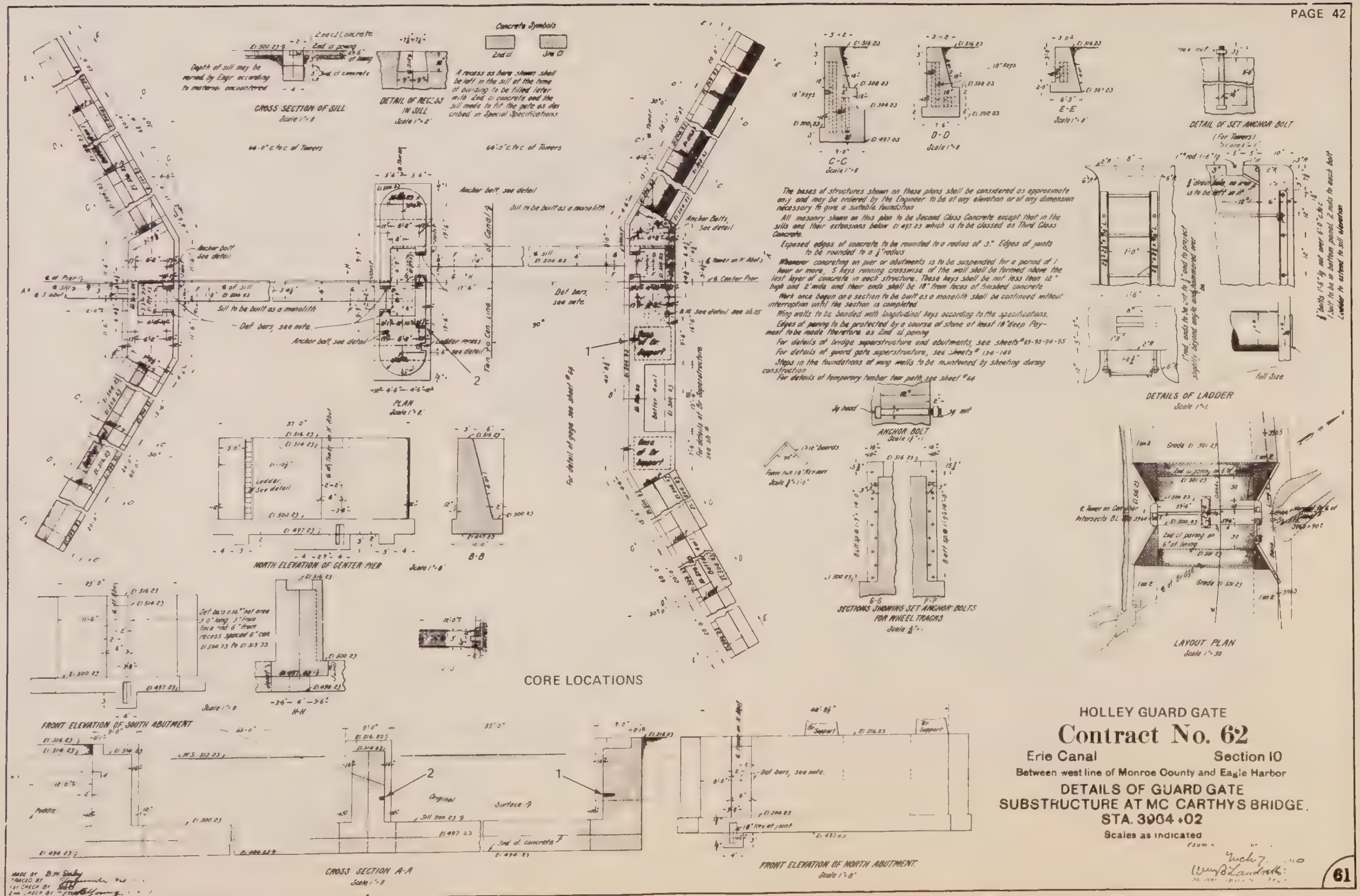
West Half North Abutment
Holley Guard Gate

East Half North Abutment
Holley Guard Gate



HOLLEY GUARD GATE

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	Center of North Abutment, 4' Above Ground	0	17"	At 14"	23½"	23½"	Best hollow sounding area. Cored into large stone.
2	Center Pier, North Side, 10' From East End, 4' Above Ground	0	6½"	0	9½"	9½"	Solid sounding area.



HOLLEY GUARD GATE

Contract No. 62

Erie Canal — Section 10

Between west line of Monroe County and Eagle Harbor

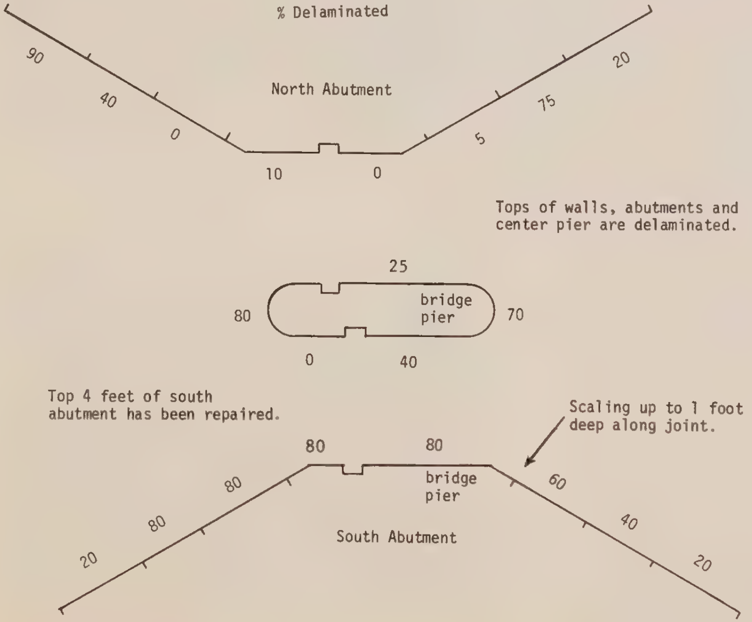
DETAILS OF GUARD GATE SUBSTRUCTURE AT MC CARTHYS BRIDGE.

STA. 3904+02

Scales as indicated

ALBION GUARD GATE

The Albion Guard Gate is located 1.4 miles west of downtown Albion. On April 7, 1976, this structure was visually inspected, sounded for delaminations and 2 cores were taken from the south abutment.



Looking East
Albion Guard Gate

West Half South Abutment and Center Pier
Albion Guard Gate

On the north abutment the majority of delaminated concrete was found in the splaywalls. Very little delaminated concrete was detected near the center of this abutment. Also, some sections of the top 2-3 feet of the abutment were completely delaminated.

The center pier contained extensive areas of delaminated concrete on the noses and on the top. Deep scaling has occurred in areas along the top, but overall the concrete was still intact. As this pier also supports a steel column for an overhead bridge, it is longer than the other guard gate piers.

The south abutment contained very extensive areas of delaminated concrete, many cracks, and a few deep scale areas. Repairs to the top 4 feet of the center of this abutment have recently been made.

The 2 cores were taken near the bottom of the abutment. Core #1, from a hollow sounding area, contained deterioration

East Half South Abutment and Center Pier
Albion Guard Gate

East Half North Abutment and Center Pier
Albion Guard Gate

8 inches deep. Core #2, from a solid sounding area, contained deterioration 7 inches deep. The fractures in Core #2 were not detected by sounding because they were very tight and the concrete was still acting as a solid piece. The lower section of Core #1 had a compressive strength of 3775 p.s.i. even though it contained 1 or 2 small fractures.

Freeze-thaw action has caused numerous cracks, scaling and delaminations along the top 2-3 feet of the structure. The south abutment and center pier appeared to contain the most deterioration.

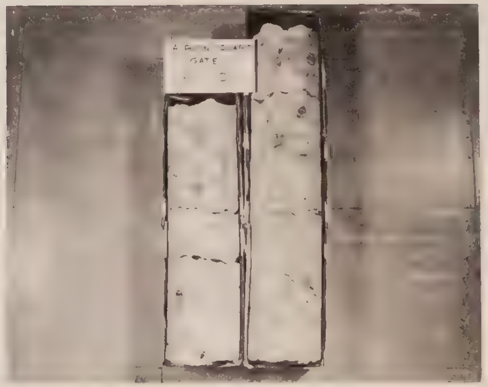
Conclusion

During sounding, some concrete areas did not seem to contain delaminated concrete. However, cores from this and other structures showed that tight fractures can exist in these areas and not be detected.

Although large areas of this structure are still in relatively good condition, future concrete repairs are recommended for the more seriously deteriorated areas.

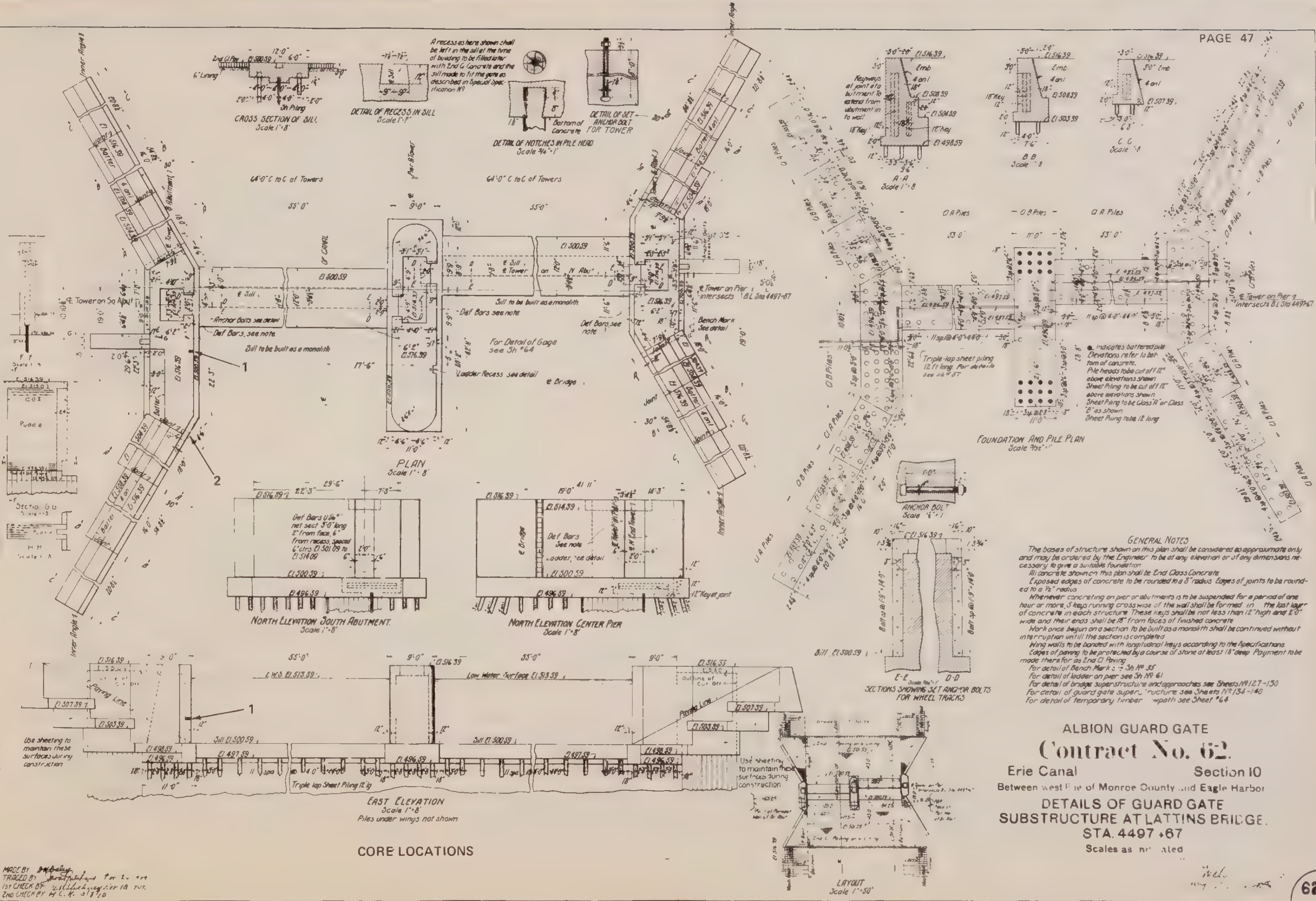
These repairs should include replacement of the concrete in the top 2-3 feet of the walls and pier. Also, all sections which contain delaminated concrete should be repaired by removing the existing concrete to an approximate depth of 8-12 inches and bonding on a new concrete surface.

West Half North Abutment and Center Pier
Albion Guard Gate



ALBION GUARD GATE

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	South Abutment, 10' East of Gate, 4' Above Ground	0	10½"	0	13½"	13½"	Hollow sounding area.
2	South Abutment, East Splay Wall, 4' From Joint With Abutment, 4' Above Ground	0	7"	At 4", 8" and 14"	18"	18"	Solid sounding area.



CORE LOCATIONS

GENERAL NOTES

The bases of structure shown on this plan shall be considered as approximate only and may be ordered by the Engineer to be at any elevation or of any dimensions necessary to give a suitable foundation

All concrete shown on this plan shall be 2nd Class Concrete

Exposed edges of concrete to be rounded to a 3" radius. Edges of joints to be rounded to a ½" radius

Whenever concreting on pier or abutments is to be suspended for a period of one hour or more, 5 keys running crosswise of the wall shall be formed in the last layer of concrete in each structure. These keys shall be not less than 12" high and 2'0" wide and their ends shall be 18" from faces of finished concrete

Work once begun on a section to be built as a monolith shall be continued without interruption untill the section is completed

Wing walls to be bonded with longitudinal keys according to the Specifications

Edges of paving to be protected by a course of stone at least 18" deep. Payment to be made therefor as 2nd Cl Paving

For detail of Bench Mark see Sh Nº 35

For detail of ladder on pier see Sh Nº 61

For detail of bridge superstructure and approaches see Sheets Nº 127-130

For detail of guard gate superstructure see Sheets Nº 134-140

For detail of temporary timber towpath see Sheet #64

ALBION GUARD GATE

Contract No. 62.

Erie Canal — Section 10

Between West Line of Monroe County and Eagle Harbor

DETAILS OF GUARD GATE SUBSTRUCTURE AT LATTINS BRIDGE.

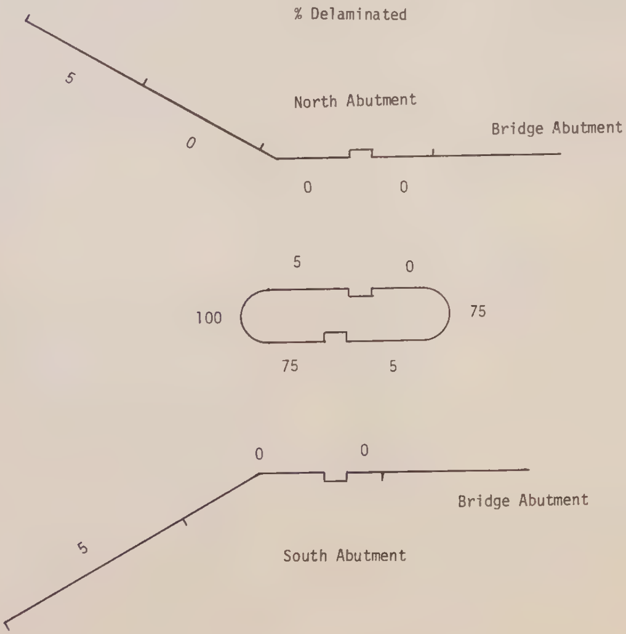
STA. 4497+67

Scales as noted

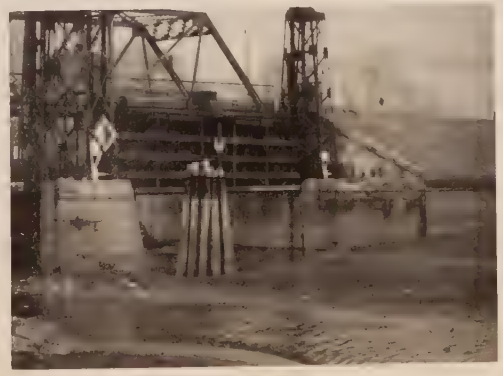
MADE BY [illegible]
TRACED BY [illegible]
1st CHECK BY [illegible]
2nd CHECK BY H. C. K.

MEDINA GUARD GATE

The Medina Guard Gate is located 1.2 miles northeast of downtown Medina. On April 1, 1976, this structure was inspected and sounded for delaminations. No large areas of visual deterioration were noted on a previous inspection and, therefore, no cores were obtained from this structure.



Looking East
Medina Guard Gate



West Half Center Pier and South Abutment
Medina Guard Gate

The most prevalent concrete deterioration on the structure has occurred to the top 2-3 feet above the water line. Freeze-thaw action in this area has caused numerous cracks, scaling and delaminations. However, the concrete was still generally intact and will probably remain so for many years.

Very little delaminated concrete was detected on either abutment. All wall faces appeared in good condition with only very small areas of scale or other deterioration noted.

The north side of the center pier appeared in good condition. Both noses and the southwest side contained areas of delaminated concrete and some small areas have started to scale.

Conclusion

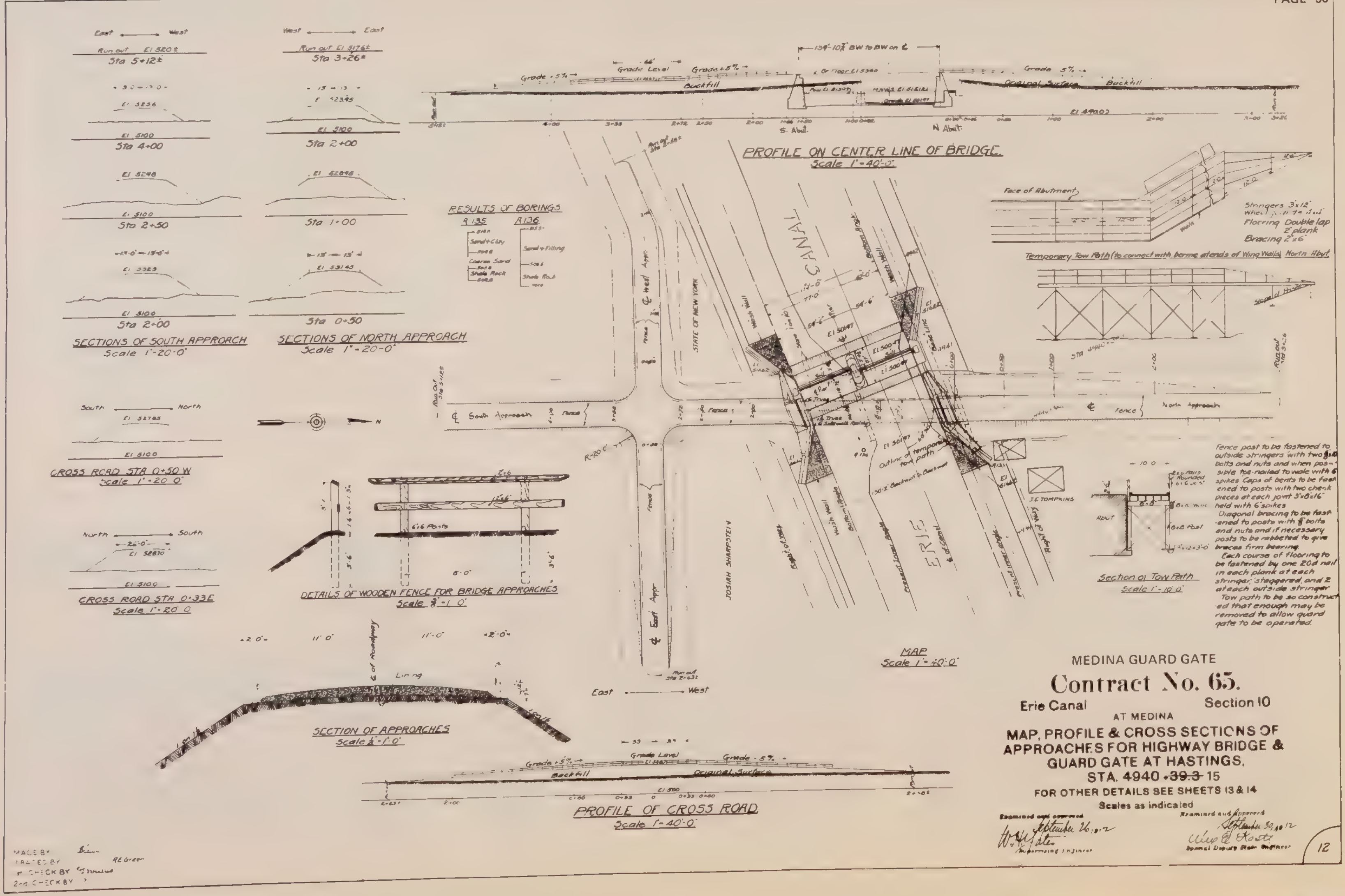
During sounding, most concrete areas did not seem to contain delaminated concrete. However, cores from other structures showed that very tight fractures can exist in these areas and not be detected.

The concrete in the structure is still in relatively good condition and no repairs are necessary at this time. Future repairs will require that the top 2-3 feet of the walls and pier be replaced. All delaminated concrete in the wall and pier faces will require removal to an approximate depth of 8-12 inches with new concrete bonded on to form a new surface.

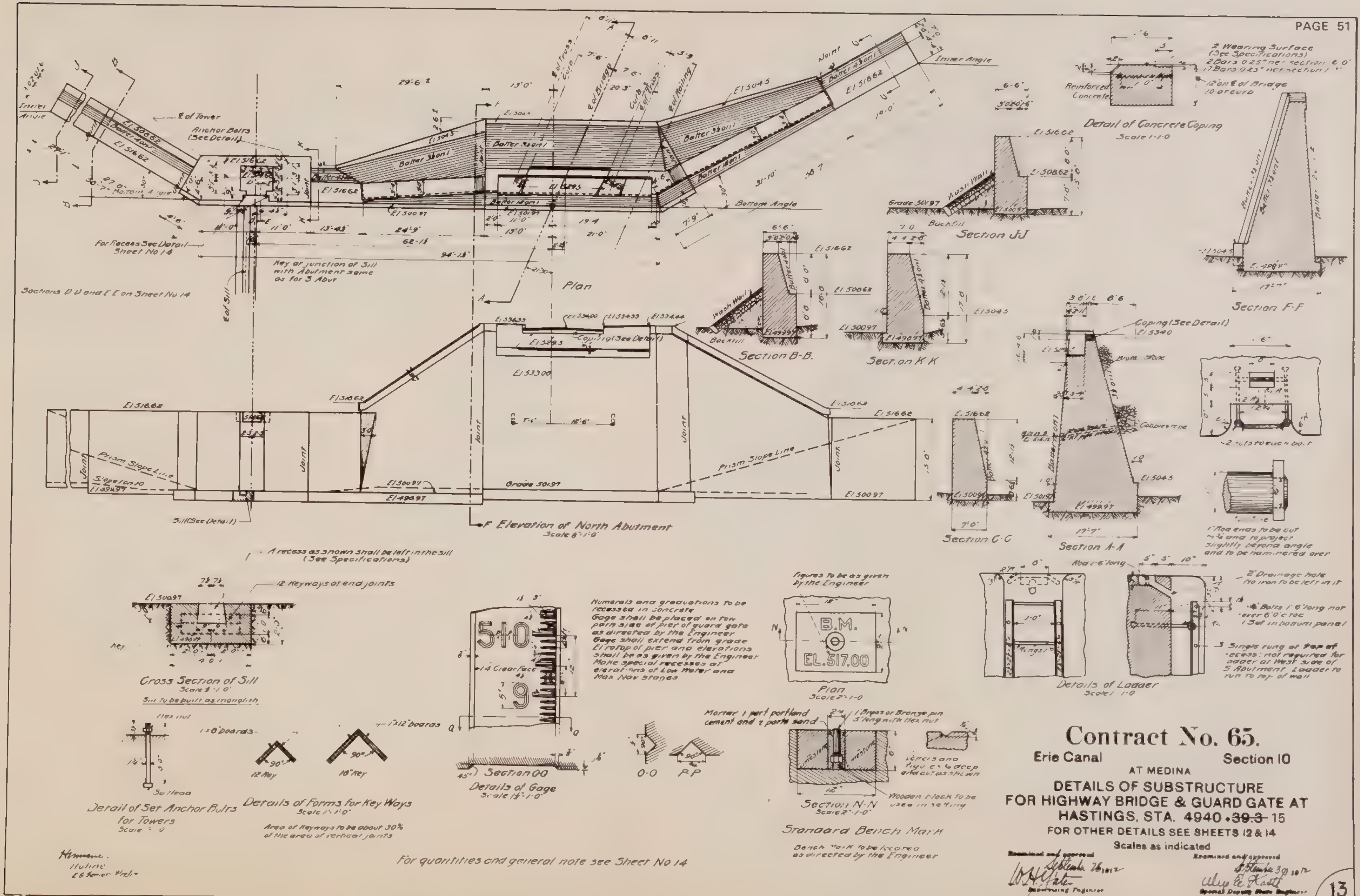
East Half Center Pier and South Abutment
Medina Guard Gate

West Half Center Pier and North Abutment
Medina Guard Gate

East Half Center Pier and North Abutment
Medina Guard Gate



SECTIONS OF SOUTH APPROACH
Scale 1"-20'-0"
SECTIONS OF NORTH APPROACH
Scale 1"-20'-0"
Sta 5+12±
Sta 4+00
Sta 2+50
Sta 2+00
Sta 3+26±
Sta 2+00
Sta 1+00
Sta 0+50
RESULTS OF BORINGS
R 135
R 136
Sand + Clay
Coarse Sand
Shale Rock
Sand + Filling
Shale Rock
PROFILE ON CENTER LINE OF BRIDGE.
Scale 1"-40'-0"
Grade Level
Backfill
Original Surface
S. Abut.
N Abut.
Face of Abutment
Stringers 3"x12"
Flooring Double lap 2" plank
Bracing 2"x6"
Temporary Tow Path (to connect with berme at ends of Wing Walls) North Abut.
CROSS ROAD STA 0+50 W
Scale 1"-20'-0"
CROSS ROAD STA 0+33 E
Scale 1"-20'-0"
DETAILS OF WOODEN FENCE FOR BRIDGE APPROACHES
6x6 Posts
CANAL
ERIE
STATE OF NEW YORK
JOSIAH SHARPSTEIN
J E TOMPKINS
South Approach
North Approach
Fence
Wash Wall
Outline of temporary tow path
Section of Tow Path
Scale 1"-10'-0"
Fence post to be fastened to outside stringers with two bolts and nuts and when possible toe-nailed to wale with 6" spikes. Caps of bents to be fastened to posts with two cheek pieces at each joint 3"x8"x16" held with 6" spikes. Diagonal bracing to be fastened to posts with bolts and nuts and if necessary posts to be rabbeted to give braces firm bearing. Each course of flooring to be fastened by one 20d nail in each plank at each stringer, staggered, and 2 at each outside stringer. Tow path to be so constructed that enough may be removed to allow guard gate to be operated.
MAP
Scale 1"-40'-0"
East
West
SECTION OF APPROACHES
PROFILE OF CROSS ROAD
Scale 1"-40'-0"
MEDINA GUARD GATE
Contract No. 65.
Erie Canal
Section 10
AT MEDINA
MAP, PROFILE & CROSS SECTIONS OF APPROACHES FOR HIGHWAY BRIDGE & GUARD GATE AT HASTINGS,
STA. 4940 +39.3 15
FOR OTHER DETAILS SEE SHEETS 13 & 14
Scales as indicated
Examined and approved
Supervising Engineer
Examined and Approved
Special Deputy State Engineer
12
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY



Contract No. 65.

Erie Canal — Section 10

AT MEDINA

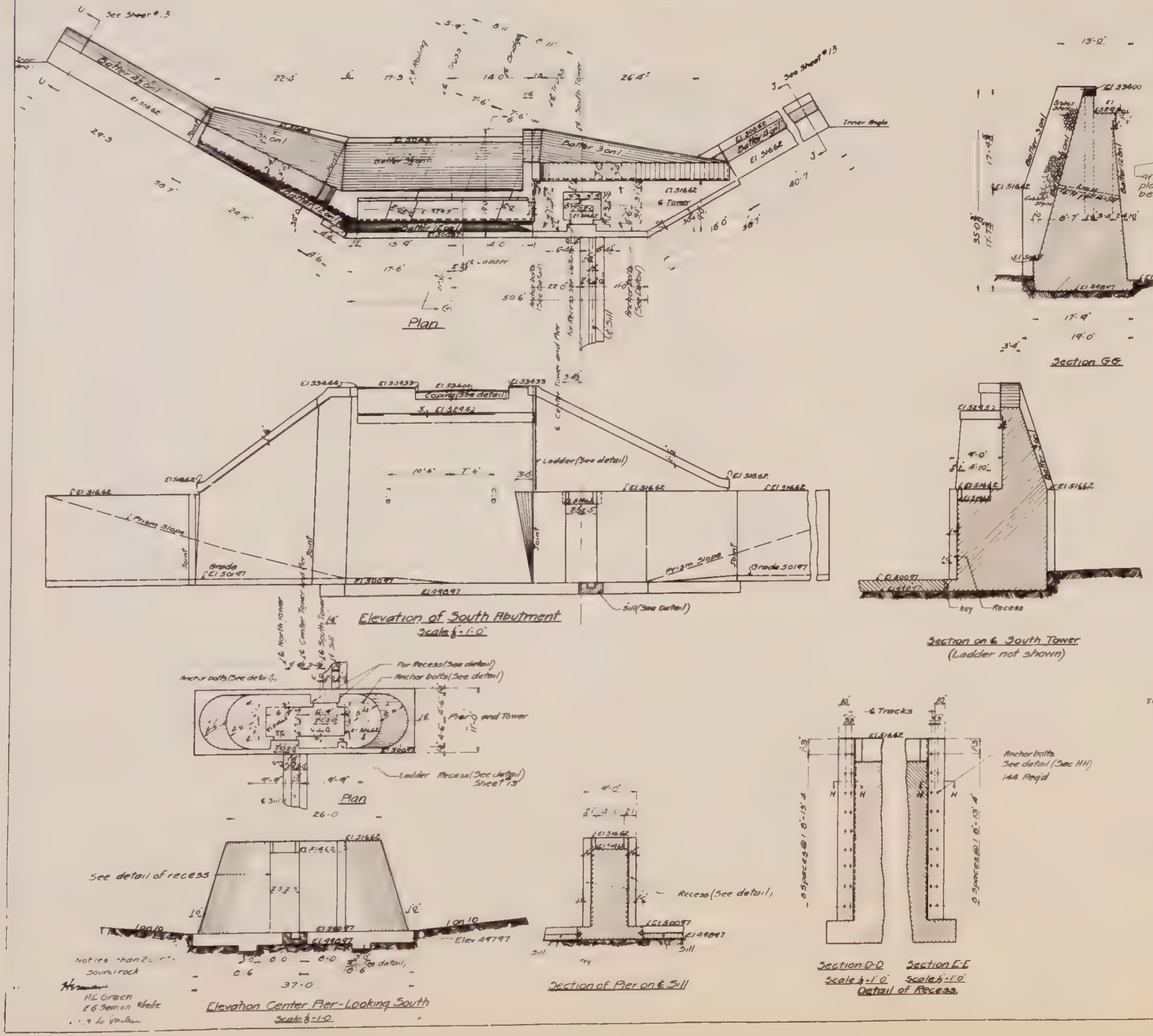
DETAILS OF SUBSTRUCTURE FOR HIGHWAY BRIDGE & GUARD GATE AT HASTINGS, STA. 4940 + ~~39.3~~ 15

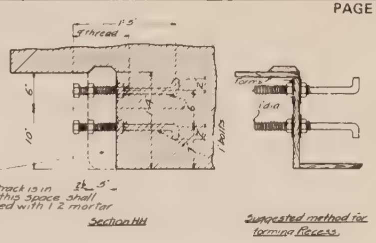
FOR OTHER DETAILS SEE SHEETS 12 & 14

Scales as indicated

Examined and approved — Supervising Engineer

Examined and approved — Special Deputy State Engineer





Detail of Anchorage for C.S. Tracks.
Scale 1 1/2"-1'-0"

Reinforced Concrete shown on sheets nos 13 and 14 to be first class concrete.
All plain concrete on sheets nos. 13 and 14 to be second class concrete.
Exposed edges of Guard Gate Masonary rounded to a radius of 3 inches, all other exposed edges rounded to a radius of 2 inches unless otherwise shown. Edges of all joints rounded to a radius of 1/2 inch.
The back wall copings to be constructed after the riveting of the end floor beams are completed
The bases of structures shown are approximate only and may be ordered by the Engineer to be at any elevation and of any dimension necessary to give a proper foundation
Whenever concreting on piers or abutments for Guard Gate is suspended for a period of one hour or more five keys running crosswise of the wall shall be formed on the last layer of concrete deposited
These keys shall be not less than 12" high and 2" wide and their ends shall be 10" from face of finished concrete
When placing backfill or embankment behind walls it shall be placed in horizontal layers not exceeding 15" in thickness.
Broken stone of same size as used in concrete or larger shall be placed against the back of the abutment and wing walls to a minimum thickness of 6 inches. This broken stone shall extend upward from the max navigable W.S. to the top of fill. It shall be paid for as "lining". The 6" vitrified pipe weeper shall be included in the contract price for 2nd class concrete

QUANTITIES

2nd Class Concrete	
North Abutment	1373 cu yds
South Abutment	1221 cu yds
Center Pier	169 cu yds
Y.P. Sawed Lumber (In temporary Towpath)	22 M Ft B.M
Structural Steel	1616 lbs
Metal Reinforcement	95 lbs
Reinforced Concrete	2 cu yds
Lining	88 " "

SEE CHANGES
PAGE 53

Contract No. 65.

Erie Canal — Section 10

AT MEDINA

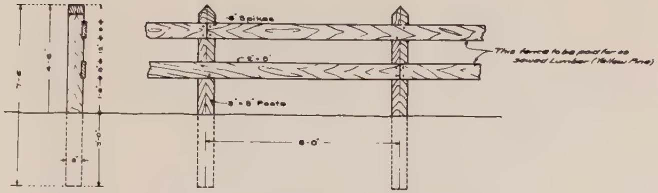
DETAILS OF SUBSTRUCTURE FOR HIGHWAY BRIDGE & GUARD GATE AT HASTINGS, STA. 4940 ~~+39.3~~ 15

FOR OTHER DETAILS SEE SHEETS 12 & 13

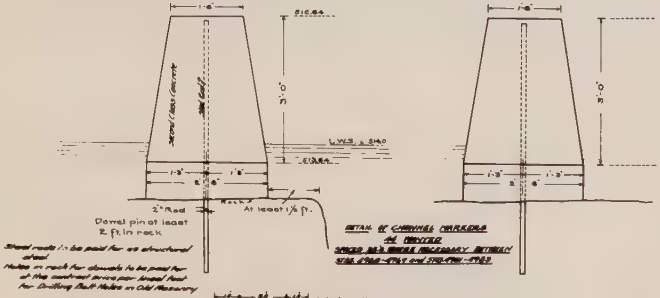
Scales as indicated

Examined and approved — September 26, 1912 — W. H. Yates, Supervising Engineer

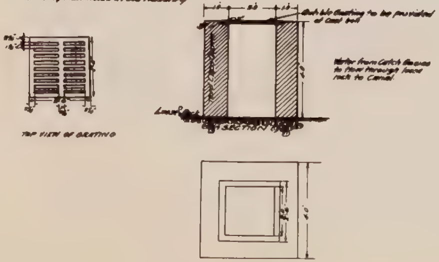
Examined and approved — September 30, 1912 — [signature], Special Deputy State Engineer



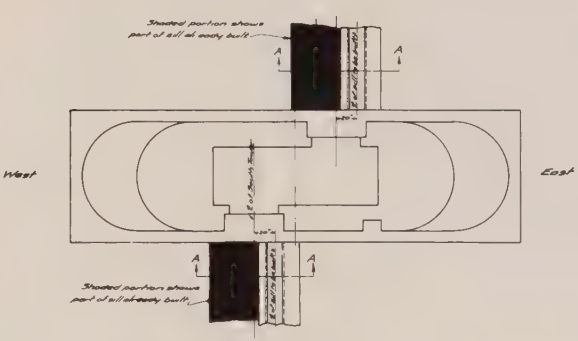
DETAILS OF HEAVY WOODEN FENCE
AT
ENDS OF MAIN ST. AND CHURCH ST.
SCALE 1 in. = 2 ft.



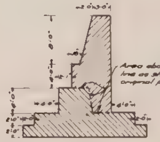
DETAIL OF CHANNEL MARKERS



DETAILS OF CATCH BASINS

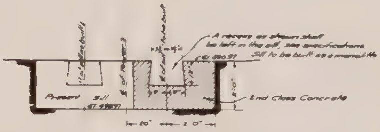


PLAN OF PIER
Showing Sills



SECTION OF WALL
Showing spread footing

All Concrete 2nd Class



SECTION A-A

GUARD GATE AT HASTINGS BRIDGE

Contract No. 65.

ALTERATION NO. 2

Erie Canal — Section 10

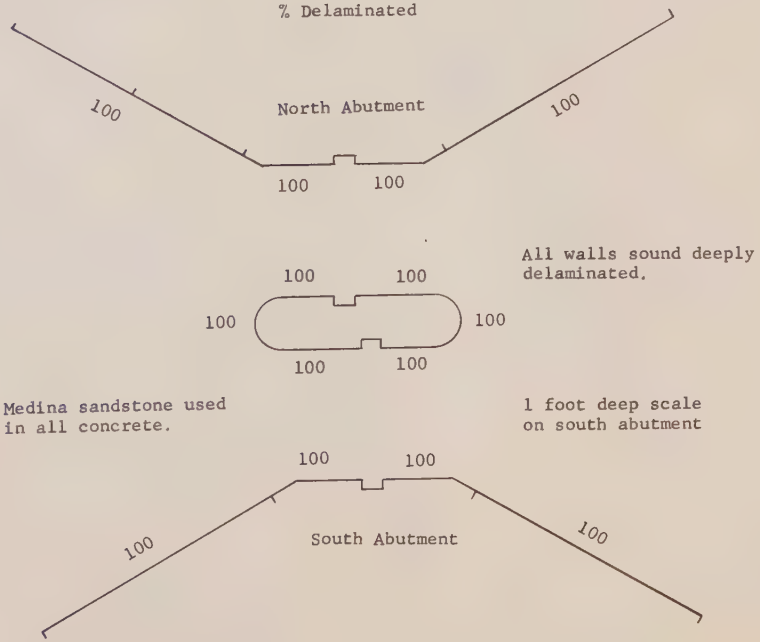
DETAILS OF MARKERS, GUARD GATE SILL, HEAVY WOODEN FENCE ETC.

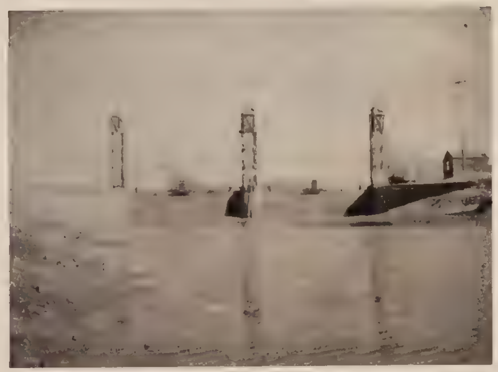
Scales as indicated

Examined and approved Sept 12 1914 — Division Engineer.

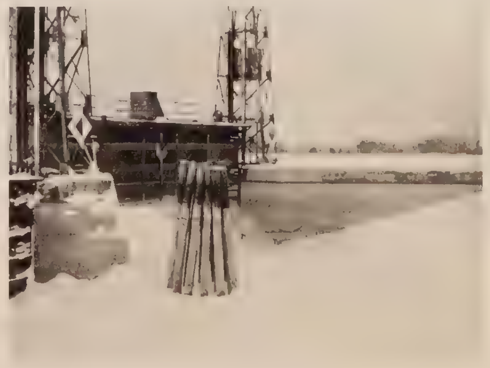
Examined and approved Sept 14 1914 — Special Deputy State Engineer.

The Middleport Guard Gate is located 1.7 miles east of Middleport. On April 8, 1976, this structure was inspected, sounded for delaminations and cored.





Looking East
Middleport Guard Gate



East Half North Abutment and Center Pier
Middleport Guard Gate

All walls of the guard gate were found to be 100% delaminated. Coring revealed that the majority of these delaminations extended deeply into the walls. Areas of scaling up to 1 foot deep existed on the south abutment and the top 6 feet of the center of the north abutment has been recently repaired.

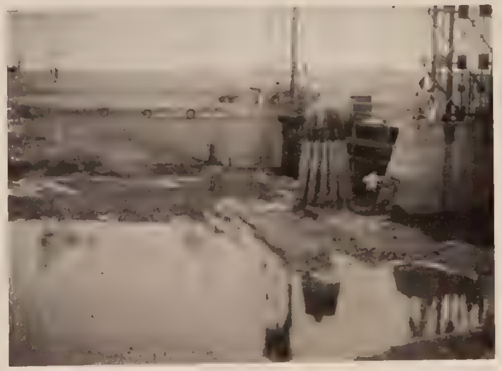
Core #1, taken from near the bottom of the south abutment, showed that deterioration continued beyond 2 feet into the wall.

Core #2, obtained from the center pier, revealed fractured concrete to a depth of 9 inches. Although equipment problems prevented deeper coring of the pier, deterioration in excess of 9 inches exists in most areas of the pier.

West Half North Abutment and Center Pier
Middleport Guard Gate

North side center pier
Middleport Guard Gate

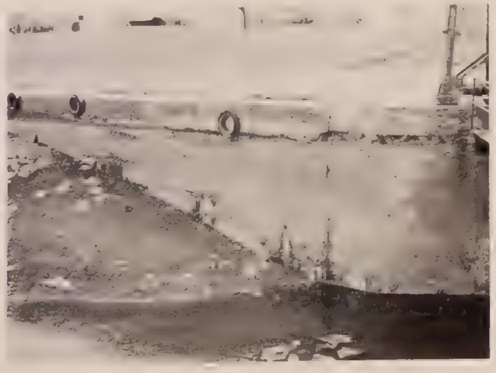
This guard gate was constructed with concrete containing crushed Medina sandstone coarse aggregate. This concrete has not held up as well as the concretes containing gravel coarse aggregates used in most other structures. Deterioration was generally found to be much more extensive and deeper in those structures containing Medina sandstone as the coarse aggregate.



East Half South Abutment and Center Pier
Middleport Guard Gate

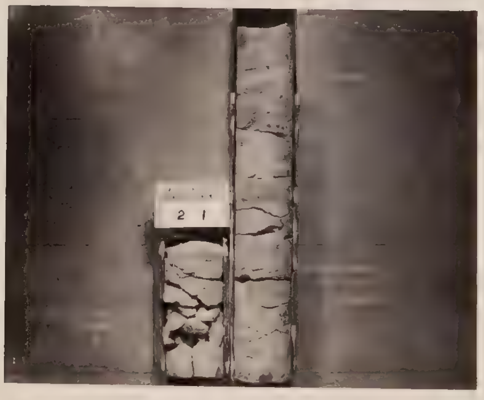
Conclusion

We believe that the concrete in this structure is fractured halfway or more through most walls. Although still mostly intact, complete replacement or very extensive repair is recommended for the near future.



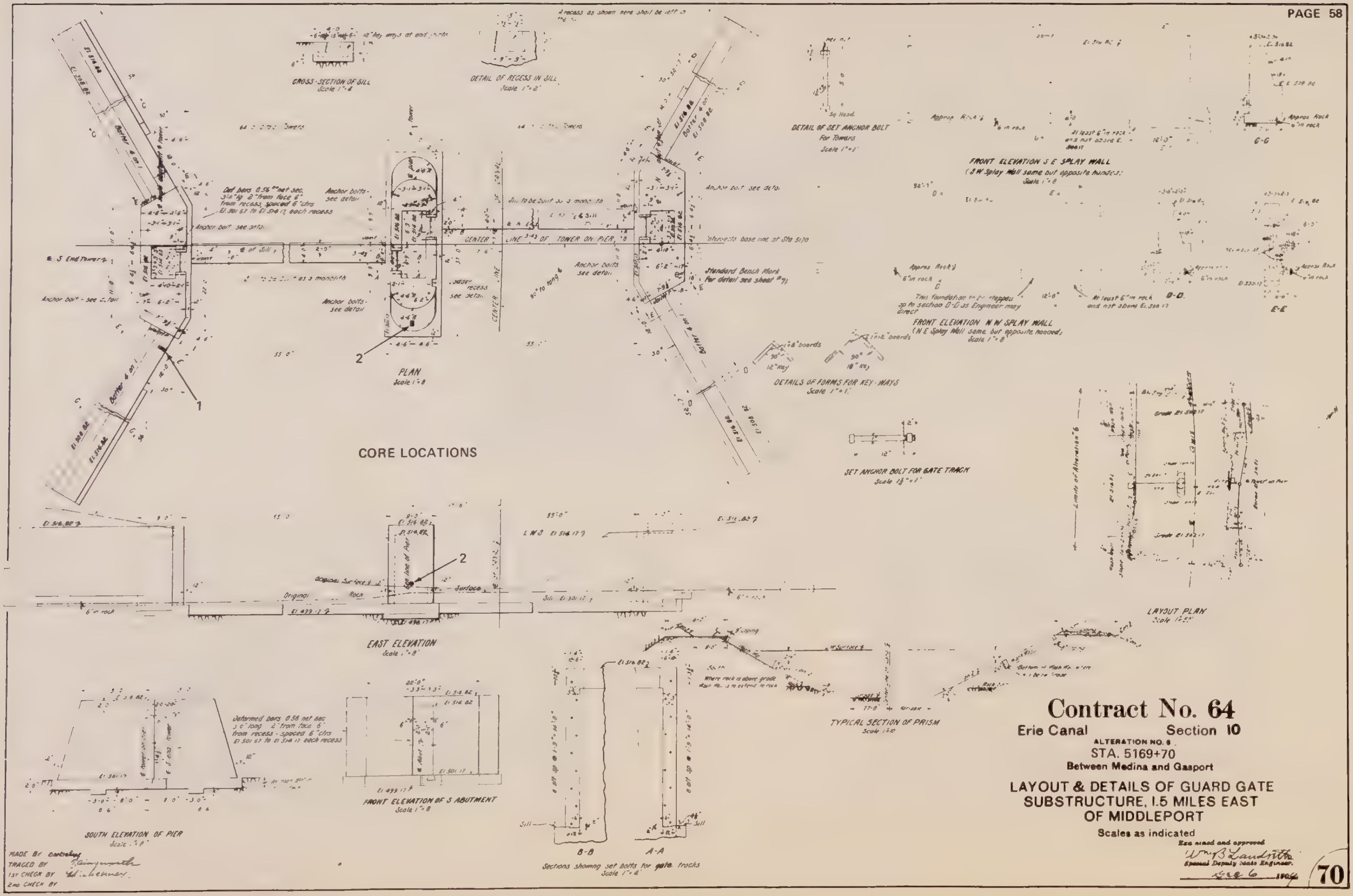
East Section of South Abutment
Note Core Hole

West Half South Abutment and Center Pier
Middleport Guard Gate



MIDDLEPORT GUARD GATE

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	South Abutment, East Splay Wall, 4' From Joint With Abutment, 4' Above Ground	0	23"	0	23"	23"	Whole wall hollow, top 2' in very poor condition. Deeper deterioration exists.
2	Center Pier, Center of East End Nose, 4' Above Ground	0	9"	0	9"	9"	All hollow, anchor pulled loose. Deeper deterioration exists.



CORE LOCATIONS

Contract No. 64

Erie Canal Section 10

ALTERATION NO. 6

STA. 5169+70

Between Medina and Gasport

LAYOUT & DETAILS OF GUARD GATE SUBSTRUCTURE, 1.5 MILES EAST OF MIDDLEPORT

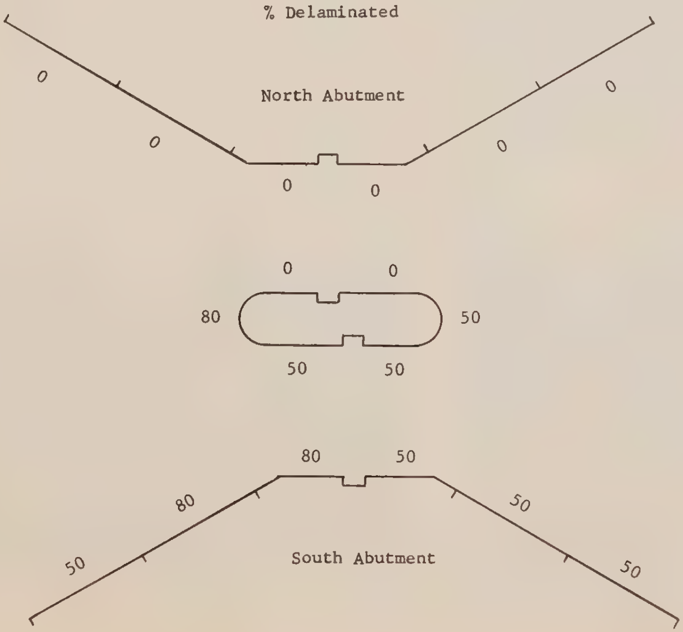
Scales as indicated

Examined and approved

Wm B Landreth

Special Deputy State Engineer

The Gasport Guard Gate is located 0.5 miles east of Gasport. On April 8, 1976, this structure was inspected, sounded for delaminations and 2 cores were taken from the south abutment.



Looking West
Gasport Guard Gate

North Abutment
Gasport Guard Gate

On the north abutment, no delaminated concrete was detected, except for the usual deterioration located in the top 2-3 feet. The wall face appeared in good condition with only a few small scaled areas.

The north side of the center pier also was in good condition with no delaminations detected. However, the south side and the pier noses contained large areas of delaminated concrete. Some surface scaling has also occurred in these areas. Overall, the concrete in the pier still appeared in relatively good condition.

The south abutment contained large areas of delaminated concrete, many cracks and a few scaled areas. Cores #1 and 2, taken near the bottom of the abutment, showed that deterioration extends 13 inches and 8 inches, respectively, into the concrete. Core #1 had a compressive strength of 6125 p.s.i. even though the lower section tested contained 1 or 2 small fractures.

South Abutment
Gasport Guard Gate

East Half South Abutment
Gasport Guard Gate

West Half South Abutment
Gasport Guard Gate

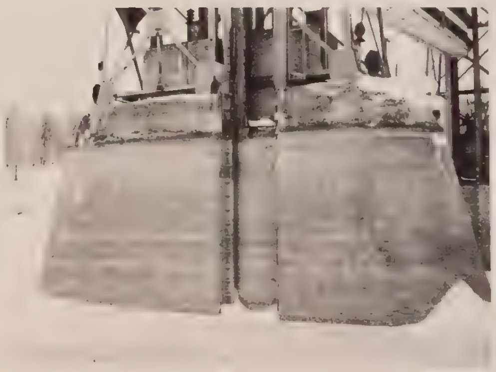
The most prevalent concrete deterioration on the structure has occurred to the top 2-3 feet above the water line. Freeze-thaw action in this area has caused numerous cracks, scaling and delaminations. The south abutment was very extensively affected whereas the center pier and north abutment contained much less deterioration.

North Side Center Pier
Gasport Guard Gate

Conclusion

During sounding, the majority of deteriorated concrete was detected in the south abutment and center pier. However, cores from other structures show that tight fractures can exist in concrete that appears to be in good condition.

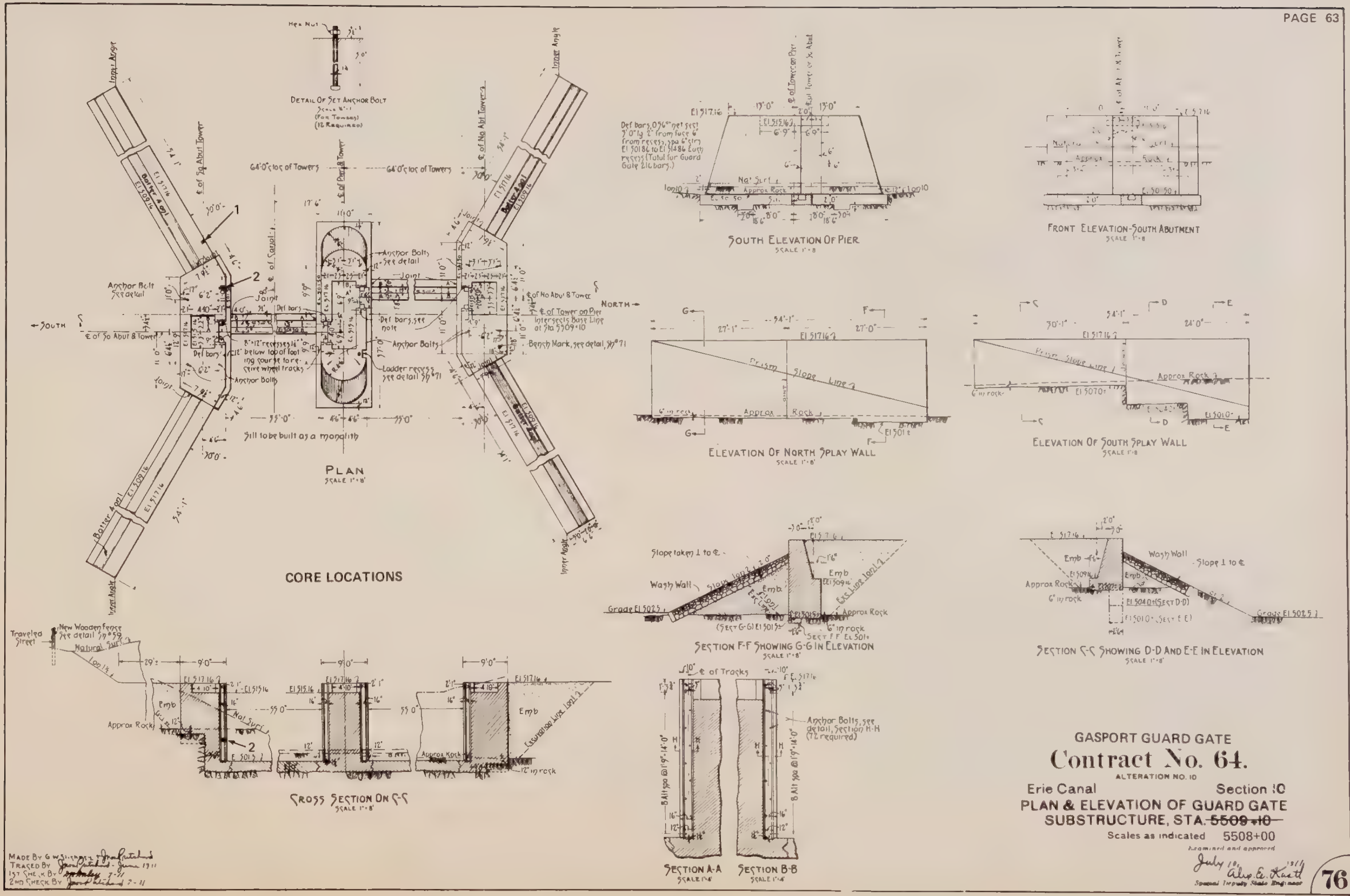
Although large areas of this structure appear to be in relatively good condition, future concrete repairs are recommended for the more seriously deteriorated areas. These repairs should include replacement of the concrete in the top 2-3 feet of the walls and pier. Also, all areas which contained delaminated and/or deteriorated concrete should be repaired by removing the existing concrete to an approximate depth of 8-12 inches and bonding on a new concrete surface.

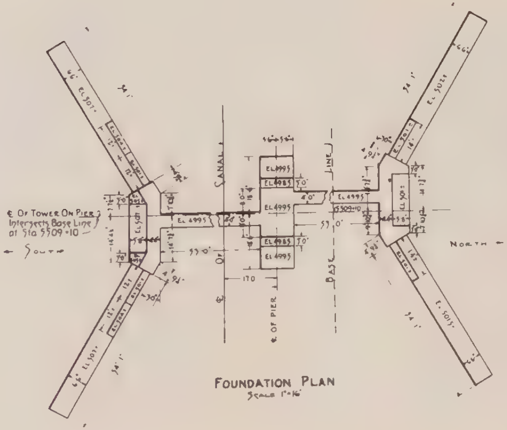


South Side Center Pier
Gasport Guard Gate

GASPORT GUARD GATE

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	South Abutment, West Splay Wall, 4' From Joint With Abutment, 4' Above Ground	0	13"	0	18"	18"	Near edge of hollow sounding area.
2	South Abutment, 6' West of Gate, 3' Above Ground	0	8"	0	12"	12"	Near edge of hollow sounding area.


DETAIL OF SET ANCHOR BOLT
SCALE 6"=1'
(FOR TOWERS)
(12 REQUIRED)
Hex Nut
PLAN
SCALE 1"=8'
Sill to be built as a monolith
CORE LOCATIONS
← SOUTH
NORTH →
Anchor Bolt
See detail
Anchor Bolts
See detail
Def bars
Def bars, see note
Anchor Bolts
Ladder recess, see detail Sh. 71
Bench Mark, see detail, Sh. 71
€ of Tower on Pier Intersects Base Line at Sta. 5509+10
€ of No Abut & Tower
€ of So Abut & Tower
64'-0" c to c of Towers
Inner Angle
Batter 4 on 1
El 517.16
El 509.16
Def bars, 0.96" net sect. 7'0" lg 2" from face 6" from recess, spa 6" ctrs El 501.86 to El 514.86 Each recess (Total for Guard Gate 216 bars.)
SOUTH ELEVATION OF PIER
SCALE 1"=8'
FRONT ELEVATION-SOUTH ABUTMENT
SCALE 1"=8'
ELEVATION OF NORTH SPLAY WALL
SCALE 1"=8'
Prism Slope Line
Approx Rock
ELEVATION OF SOUTH SPLAY WALL
SCALE 1"=8'
SECTION F-F SHOWING G-G IN ELEVATION
SCALE 1"=8'
Slope taken ⊥ to €
Wash Wall
Emb
Grade El 502.5
Approx Rock
6" in rock
SECTION C-C SHOWING D-D AND E-E IN ELEVATION
SCALE 1"=8'
Wash Wall
Slope ⊥ to €
Approx Rock
6" in rock
Traveled Street
New Wooden Fence See detail Sh. 59
Natural Surf
Emb
Approx Rock
12" in rock
CROSS SECTION ON C-C
SCALE 1"=8'
€ of Tracks
Anchor Bolts, see detail, Section H-H (72 required)
SECTION A-A
SCALE 1"=4'
SECTION B-B
SCALE 1"=4'
GASPORT GUARD GATE
Contract No. 64.
ALTERATION NO. 10
Erie Canal
Section 10
PLAN & ELEVATION OF GUARD GATE
SUBSTRUCTURE, STA. 5509+10
5508+00
Scales as indicated
Examined and approved
July 10, 1911
Special Deputy State Engineer
MADE BY
TRACED BY
1ST CHECK BY
2ND CHECK BY
76



FOUNDATION PLAN
Scale 1"=16'

General Notes For Guard Gate

All concrete shown on this plan to be 2nd Cl Concrete.

Round all exposed edges of concrete to a radius of 3" unless otherwise shown Round edges of joints to a radius of ½"

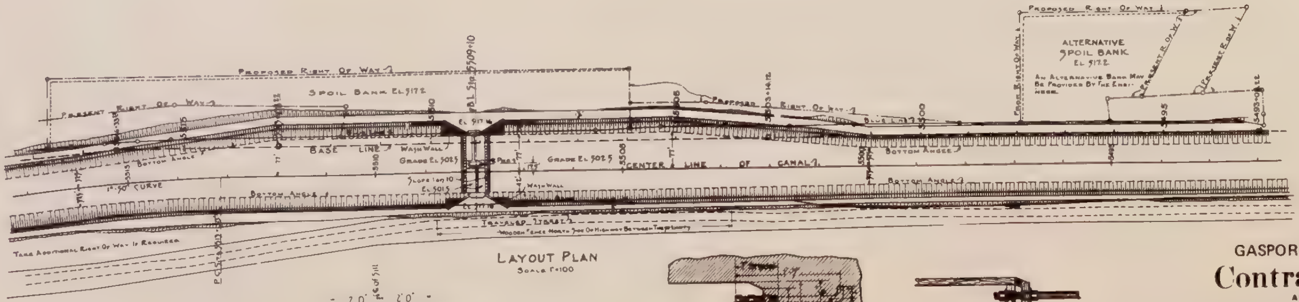
The bases of structures shown on this plan are approximate only and may be ordered by the Engineer to be at any elevations or of any dimensions necessary to give a proper foundation.

Whenever concreting on pier or abutments is to be suspended for a period of one hour or more, five keys running crosswise of the wall shall be formed above the last layer of concrete in each structure These keys shall be not less than 12" high and 2' wide and their ends shall be 18" from face of the finished concrete

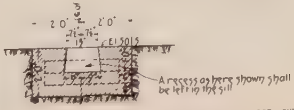
Wing walls to be bonded with longitudinal keys according to the specifications.

For details of temporary timber towpath see Sh #71 Dimensions to be altered by the Engineer to suit local conditions

For details of gage see Sh #71

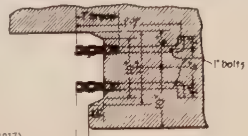


LAYOUT PLAN
Scale 1"=100'



CROSS SECTION OF SILL
Scale 1"=2'

SEE CONTRACT NO. 163, SHEET 5 (JULY, 1917), FOR MINOR SILL REPAIRS AND RECESS FILLING.



SECTION H-H.

SUGGESTED METHOD FOR FORMING RECESS.

DETAIL FOR SETTING FOR C.S. TRACK.
Scale 1½"=1'

GASPORT GUARD GATE

Contract No. 64.

ALTERATION NO 10

Erie Canal — Section 10

LAYOUT & DETAILS OF GUARD GATE SUBSTRUCTURE, STA. ~~5509+10~~ 5508+00

Scales as indicated

Examined and approved
July 10, 1911.
Alex. E. Kastl
Special Deputy State Engineer.

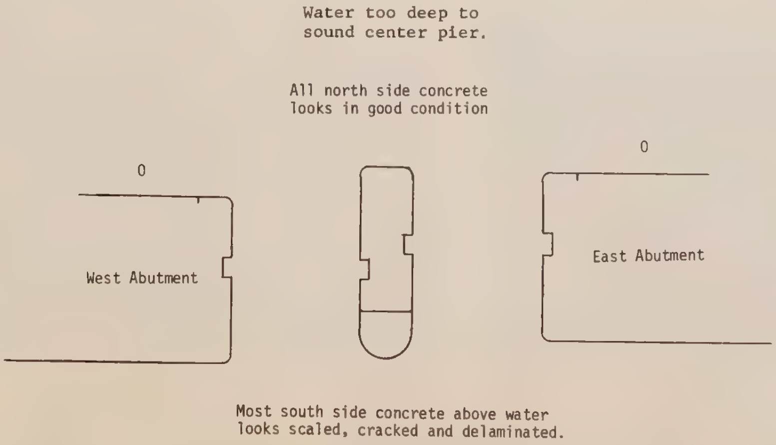
77

Made By [signature]
Traced By [signature]
1st Check By D.M. Daley 7-11
2nd Check By [signature] 7-11

PENDLETON GUARD GATE

The Pendleton Guard Gate is located 4.5 miles southwest of Lockport in the Township of Pendleton. On April 1, 1976, this structure was inspected and sounded for delaminations. As no large areas of visual deterioration were noted on a previous inspection, and considering the difficulty of getting equipment to the site, no cores were taken from this structure.

Since there are no other gates between this one and the Niagara River, the water level on the south side of the gate always remains at full depth. Due to periodic high water levels on the river, this guard gate is over 12 feet higher than the other guard gates. Whereas the other guard gates generally face east and west, this structure faces north and south.



Looking South
Pendleton Guard Gate

West Side Center Pier and East Abutment
Pendleton Guard Gate

All concrete on the north side of the gate appeared in very good condition. No delaminations were detected on the abutment sidewalls and there were practically no signs of any cracks or scaling on the abutments or center pier. Even the concrete in the top 2 feet was in good condition with no cracks or delaminations. Due to deep water, it was not possible to sound the center pier or abutment faces.

On the south side, above the water line, practically all concrete appeared in fair condition. Although presently intact, the 9 foot high concrete nose on the center pier was cracked, delaminated, and the surface scaled. Both abutments were in better condition, but cracks, scaling and delaminations were widespread. Concrete below the water line is impossible to visually inspect due to muddy water. However, as the north side concrete was still in good condition and the south side is always under water, we believe this concrete should still be in good condition.

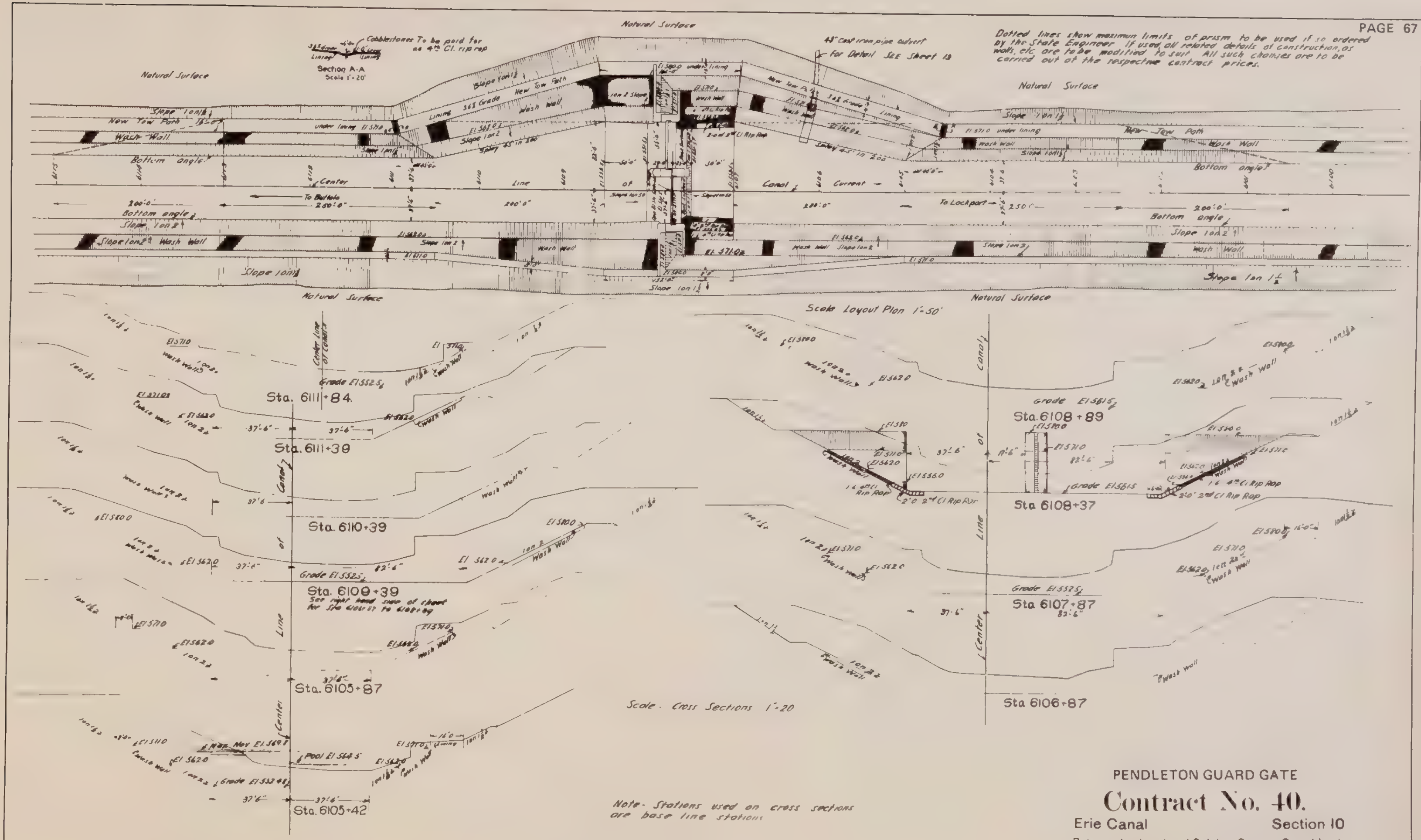
CONCLUSION

The concrete in this structure is still in relatively good condition and no immediate repairs are recommended. Future repairs should include removal and replacement of 8 inches or more of concrete on the wall faces and tops, and replacement of the 9 foot high pier nose section. The majority of these repairs will be required only on the south side of the gate.

East Side Center Pier and West Abutment
Pendleton Guard Gate

West Side Center Pier and East Abutment
Pendleton Guard Gate

East Side Center Pier and West Abutment
Pendleton Guard Gate



PENDLETON GUARD GATE

Contract No. 40.

Erie Canal Section 10

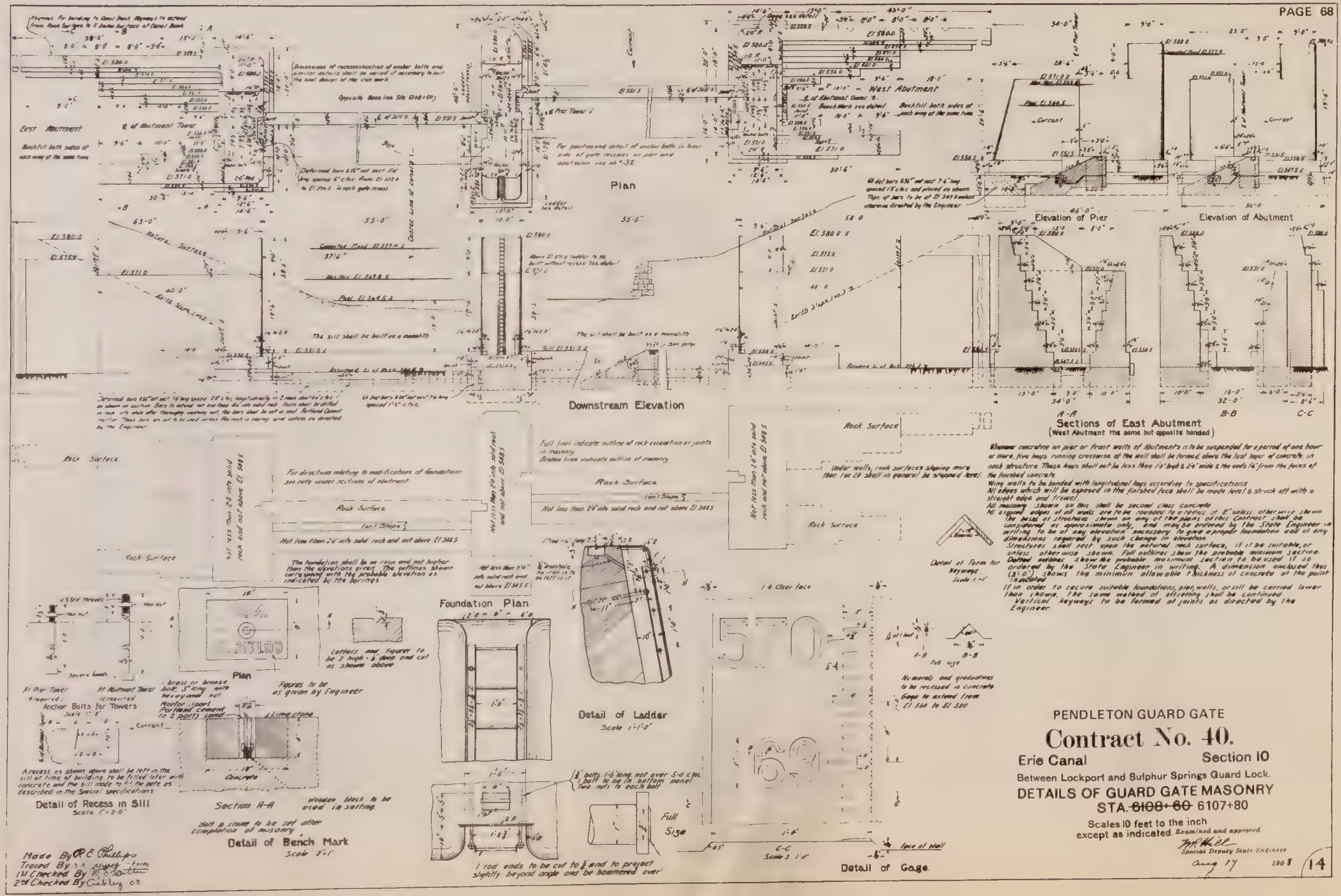
Between Lockport and Sulphur Springs Guard Lock

LOCATION PLAN & SECTIONS OF GUARD GATE STA. ~~6108+60~~ 6107+80

Scales as indicated.

Examined and approved
[signature]
Special Deputy State Engineer
Aug 17 1908

Made By R.E. Phillips Aug '8
Traced By J.H. Forth
1st Checked By F.C. [illegible]
2nd Checked By R.E. Phillips


Plan
East Abutment
West Abutment
Downstream Elevation
Elevation of Pier
Elevation of Abutment
Sections of East Abutment
(West Abutment the same but opposite handed)
A-A
B-B
C-C
Foundation Plan
Detail of Ladder
Scale 1"=1'-0"
Detail of Gage.
Anchor Bolts for Towers
Detail of Recess in Sill
Section A-A
Detail of Bench Mark
Detail of Form for Keyways
Rock Surface
The sill shall be built as a monolith
Full lines indicate outline of rock excavation or joints in masonry
Broken lines indicate outline of masonry
The foundation shall be on rock and not higher than the elevations given. The outlines shown correspond with the probable elevation as indicated by the borings
Letters and figures to be 2 high & ¼ deep and cut as shown above
Figures to be as given by Engineer
Numerals and graduations to be recessed in concrete. Gage to extend from El 560 to El 580
I rod ends to be cut to ¾ and to project slightly beyond angle and be hammered over
Wing walls to be bonded with longitudinal keys according to specifications
All masonry shown on this sheet to be second class concrete
Vertical keyways to be formed at joints as directed by the Engineer
PENDLETON GUARD GATE
Contract No. 40.
Erie Canal
Section 10
Between Lockport and Sulphur Springs Guard Lock.
DETAILS OF GUARD GATE MASONRY
STA. 6108+60 6107+80
Scales 10 feet to the inch
except as indicated.
Examined and approved
Special Deputy State Engineer
1908
14
Made By R E Phillips
Traced By
1st Checked By
2nd Checked By

Between each pair of guard gates or guard gate type structures, such as locks and guard locks, there are 1 to 3 water level control structures called waste gates or sluiceways. These are always constructed parallel with the embankment and usually have a small dam or weir attached to one side. Water passing through the waste gate or over the weir feeds into a natural stream capable of handling large flows.

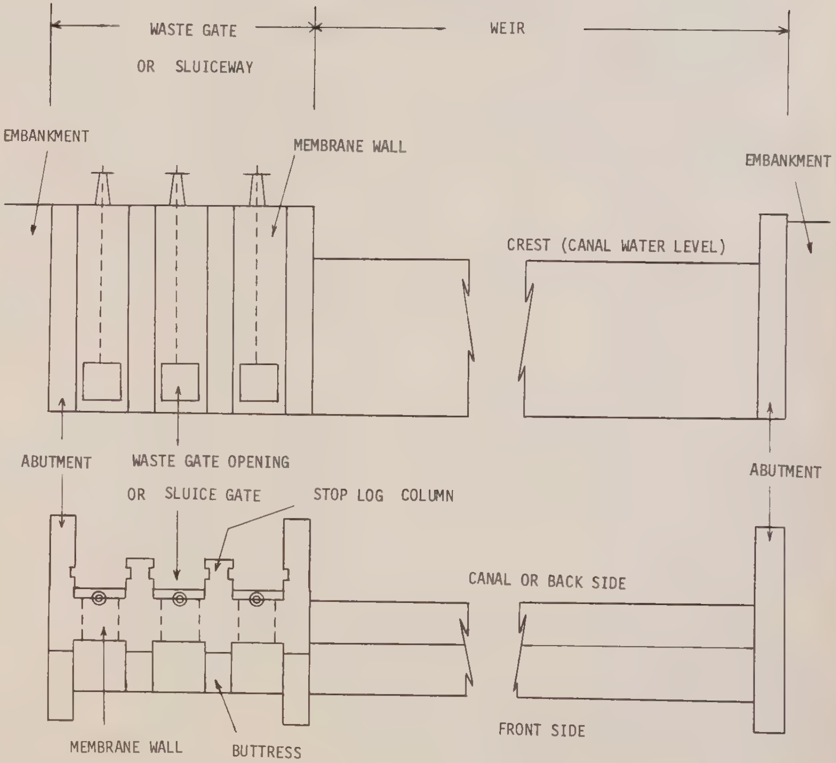
Canal water flows from the Niagara River at Tonawanda to the Locks at Lockport. From Lockport the water flows eastward across the "60 Mile Level", where the majority of the waste gates are located, to the Genesee River at Rochester. The Genesee River normally feeds the canal to the east except during periods of low flow. During this period,water fed by the Niagara River supplements the water supply to the east of Rochester.

The major function of the waste gates is to drain that section of the canal between two closed guard gates. This draining could result from an emergency, such as an embankment or culvert leak, or at the end of the season when the entire canal is drained.

The waste gates are also used to regulate the flow and level of the canal by discharging a controlled amount of water. This water is also used downstream to generate power at Medina and Rochester and by industry at Lockport. A new function of the waste gates has been to increase the flow rate of certain streams. This is being done in an attempt to get fish from Lake Ontario to come upstream to spawn.

The only function of a weir is to act as a safety valve and release large quantities of high water quickly. The crest of the weir is at normal canal water elevation and, if the water rises, it passes over the top of the weir. This

TYPICAL STRUCTURE



prevents water from overflowing and washing out an embankment section. The crest elevation of nearly all the weirs has been raised by attaching angle irons or boards to the crest. This reduces water loss from waves and allows the canal water level to rise a few inches.

Most of the structures have a weir attached to one or both sides of the waste gate. Two structures (Albion and Brockville) have the weir and waste gate combined into one section. At Albion, there is also a weir on one side in addition to the one over the sluiceway.

In the Spring of 1976, the 13 waste gates and weirs between Lockport and Rochester, and the one east of Rochester at Fairport, were inspected. Cores were obtained from all except the ones at Greece (recently rebuilt) and Fairport (very good condition).

As shown in the original Barge Canal plans, two structures utilize sections of the enlarged Erie Canal waste gates and weirs. The Albion Waste Gate and Weir is a stone masonry structure faced and capped with concrete, and the Lockport Waste Gate has stone block columns and walls encased in concrete.

Contract 163 contained plans for filling notches in 10 of the 13 weirs between Rochester and Lockport. These 2 foot deep notches maintained the water level of the enlarged Erie Canal until the new Barge Canal was completed. However, no bids were received on Contract 163. Therefore, Department Forces filled the notches with concrete in the Spring of 1918 to bring the water up to the present level. These notches are not shown on any of the waste gate and weir plans.

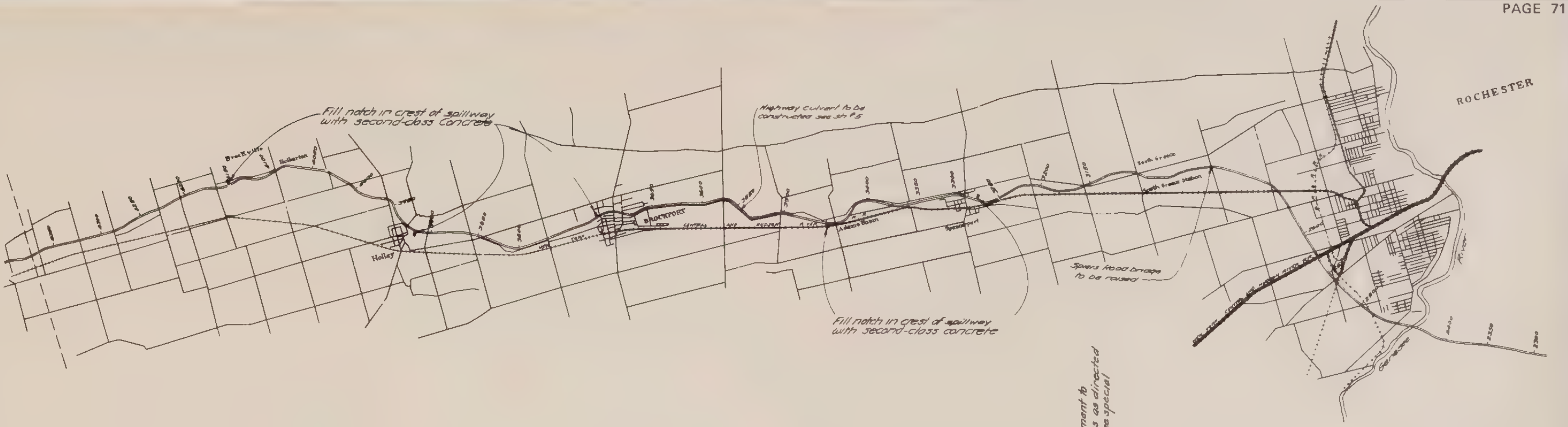
During our inspections, most of these notches were noticeable by the construction joints. In some, the concrete used to fill the notches has deteriorated considerably more than the adjacent original concrete. In 1976, the notch area at the Lockport Weir was removed and rebuilt. Instead of the notch being straight across as shown in Contract 163, the notch was stepped to form a keyway.

Five of the waste gates and weirs (Fairport, Greece, Brockport, Brockville, and Gasport) are either in good condition or have been recently rebuilt. The other 9 all need various repairs.

Vegetation in the form of grass and brush was observed growing from the crest of weirs and in cracks of the waste gates, especially Medina and Adams Basin. This is not only unsightly, but plant roots accelerate concrete deterioration.

Two of the structures (Adams Basin and Eagle Harbor) were almost completely covered with shotcrete and others were partially covered. All the shotcrete was loose since little or no surface preparation was made to the existing concrete. This cosmetic repair hindered the evaluation of the structures.

Problems were also encountered in operating the waste gate valve machinery at Albion, Medina, Middleport, and Lockport. Some of these gate valves did not function properly and some could not be operated at all.



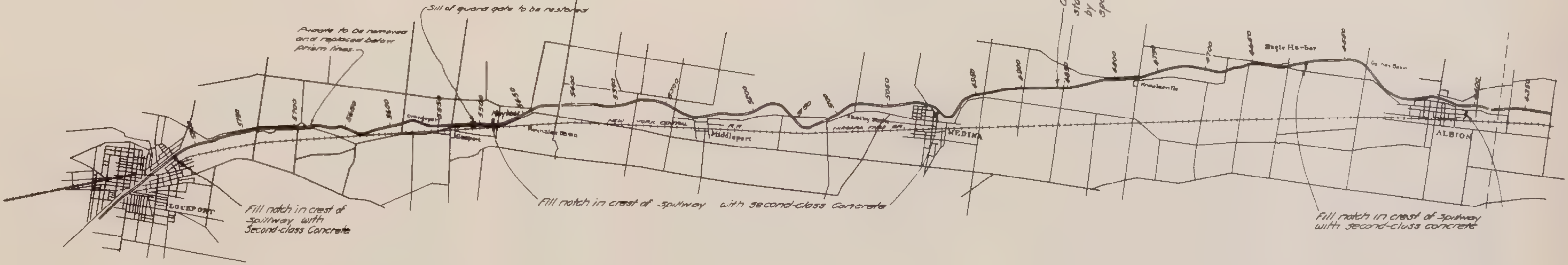
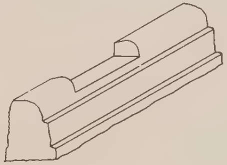


Table of Waste Weirs to be Completed		
Location	Length of Notch	Approx. Quan. Concrete
Spencerport	10.0'	6 c.y.
Adams Basin	28.5'	17 c.y.
Brockport	10.0'	4 c.y.
Holley	25.0'	11 c.y.
Brockville	13.5'	4 c.y.
Albion	24.0'	10 c.y.
Eagle Harbor	25.0'	9. c.y.
Medina	60.0'	34 c.y.
Maybees	14.0'	4 c.y.
Lockport	42.5'	20 c.y.



View showing Typical Crest & Notch

FILL NOTCH IN WEIRS

Contract No. 163

Erie Canal — Sections 9 & 10

MAP SHOWING LOCATION OF WORK TO BE DONE

Scale: 1 inch - 1 Mile

Examined and approved
July 27 1917
F. Williams
Division Engineer.

Examined and approved
July 27 1917
Special Deputy State Engineer

Made by
Traced by F.D.
1st Check by J.A. Powell
2nd Check by

2

FAIRPORT WEIR AND WASTE GATE

The Fairport Waste Gate and Weir is located in Fairport on the north side of the canal. In the center of the structure are 4 sluice gate openings and 20 foot long weirs abut both ends of the waste gate.

The membrane wall and buttresses of the waste gate appeared in very good condition with only a few small cracks and no delaminations or scaling. Deep water prevented sounding the lower wall surfaces.

Both weirs also appeared in good condition. A few cracks were denoted by efflorescence and small isolated spots of scaling existed. The only problem seen on the structure was that the top 6 inches of the west weir crest was delaminated. The east weir crest was in much better condition with only a few small scaled areas. A number of cracks existed on the abutments and some scaling and delamination has occurred on top of the west abutment.

North Side
Fairport Waste Gate

West Abutment
Fairport Weir

East Abutment and East Half of Weir
Fairport Weir

On all the other waste gate and weir structures, the towpath bridge is located in front of the weir. At Fairport, the towpath bridge is located behind the weir and supported by 3 piers just above the canal water level. This 4 span, concrete T-beam bridge appeared in generally good condition, but a few cracks were noted on the piers and abutments. Also, there were 2 or 3 areas where the concrete had spalled off the bottom of the beams and exposed the reinforcing steel.

Due to the generally good condition of this waste gate and weir structure, and the deep water on both sides, no cores were taken and the concrete was not completely sounded for delaminations.

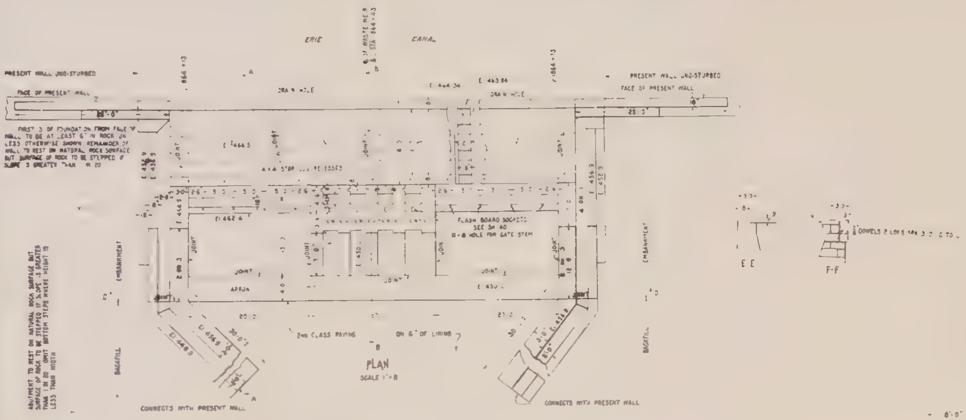
CONCLUSION

This structure is still in good condition and only isolated repairs are presently recommended.

West Half, Note crack along crest
Fairport Weir

Looking West
Fairport Weir

Canal Side, Looking North
Fairport Weir



GENERAL NOTES

ALL MASONRY SHOWN ON THIS SHEET EXCEPT THE TOW PATH BRIDGE (GIRDERS AND FLOOR SLABS) TO BE 2nd CLASS CONCRETE

THE TOW-PATH BRIDGE (GIRDERS AND FLOOR SLABS) TO BE 2nd CLASS REINFORCED CONCRETE

ALL EXPOSED EDGES OF MASONRY TO BE ROUNDED TO A RADIUS OF 3" UNLESS OTHERWISE SHOWN

EACH 20 SECTION OF THE SPILLWAY AND THE SLUICEWAY AND EACH SPAN OF BRIDGE SHALL BE BUILT AS MONOLITHS WORK ONCE BEGUN ON A SECTION TO BE BUILT AS A MONOLITH SHALL BE CONTINUED WITHOUT INTERRUPTION UNTIL IT IS COMPLETED

THE BASES OF STRUCTURES SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND MAY BE ORDERED BY THE ENGINEER TO BE OF ANY DIMENSIONS AND AT ANY ELEVATIONS NECESSARY FOR A PROPER FOUNDATION

FOUNDATION OF SPILLWAY AND SLUICEWAY SECTION TO EXTEND AT LEAST 12" INTO SOLID ROCK EXCEPT WHERE SHOWN OTHERWISE

THE OLD SPILLWAY ENTIRE IS TO BE REMOVED AND SUCH PART OF THE OLD DITCH RETAINING WALLS AS IS SHOWN ON THE PLANS

THERE SHALL BE PROVIDED FOR THE GATE OPENINGS SHOWN ON THIS SHEET FOUR 24"x 24" RECTANGULAR SLUICE GATES WITH NON-RISING STEMS TOGETHER WITH THE NECESSARY STANDARDS OPERATING MACHINERY, ANCHOR BOLTS ETC THESE GATES TO BE OPERATED BY HAND UNDER A HEAD OF 13 FT AND ARE TO BE UP TO THE STANDARD OF PRACTICE OF MANUFACTURES OF RECOGNIZED STANDING AND ARE TO BE SATISFACTORY TO THE ENGINEER

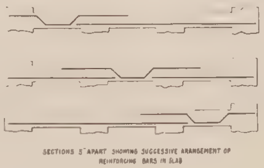
SMALL CHANGES IN THE DIMENSIONS OF THE CONCRETE WORK MADE NECESSARY BY THE KIND OF GATES AND OPERATING MACHINERY USED ARE TO BE MADE AS ORDERED BY THE ENGINEER

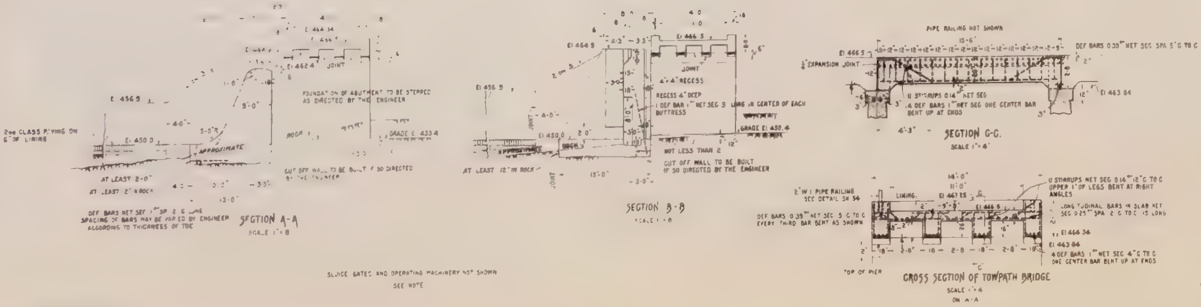
IF NECESSARY ADDITIONAL DETAILS FOR SETTING OF GATE STANDARDS AND FASTENINGS WILL BE FURNISHED LATER AND CONSIDERED A PART OF THIS PLAN

WHERE ROCK IS AT GRADE OF DITCH NO PAVING IS TO BE PLACED

THE SLUICE WAY AT STA 1890 + 6.8 SHOWN ON SHEET NO 39 IS ELIMINATED BY THIS ALTERATION AND THE PRISM AT THAT LOCATION IS TO BE BUILT ACCORDING TO THE TYPICAL SECTION

FOR LAYOUT PLAN SEE SH NO 147





Contract No. 63.

ALTERATION NO 4

Erie Canal STA. 1864+20 Section 9

DETAIL PLANS OF NEW WASTE WEIR AT SITE OF OLD WASTE WEIR EAST OF FAIRPORT

Scales as indicated

February 20
February 27 12

GREECE WEIR AND WASTE GATE

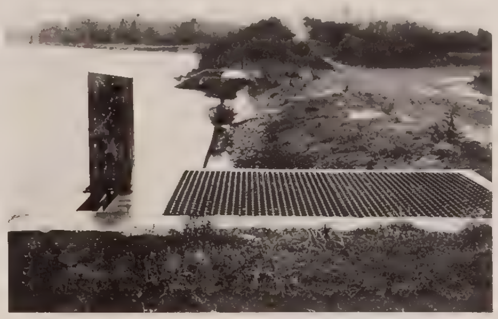
The Greece Waste Gate and Weir is located in South Greece about 1/2 mile west of Long Pond Road on the north side of the canal. Originally, the waste gate had 4 openings and extended eastward for 100 feet. As seen from the rear, this structure appeared to have been seriously deteriorated.

Land development adjacent to the downstream drainage channel prevented the simultaneous opening of all four gates. Therefore, in the middle 1960's, this structure was made inoperative by constructing an earthen embankment in front of the weir. A new waste gate with a single opening was then constructed by Canal Maintenance Personnel at the east end of the inoperative weir. The gate and other necessary hardware were obtained from the Brockport Waste Gate where 1 of 3 gate openings was permanently sealed.

Canal water passes through the new waste gate into a concrete well covered with a steel grate and then goes through a small culvert under the embankment.

CONCLUSION

This new waste gate was in excellent condition and no work is recommended.

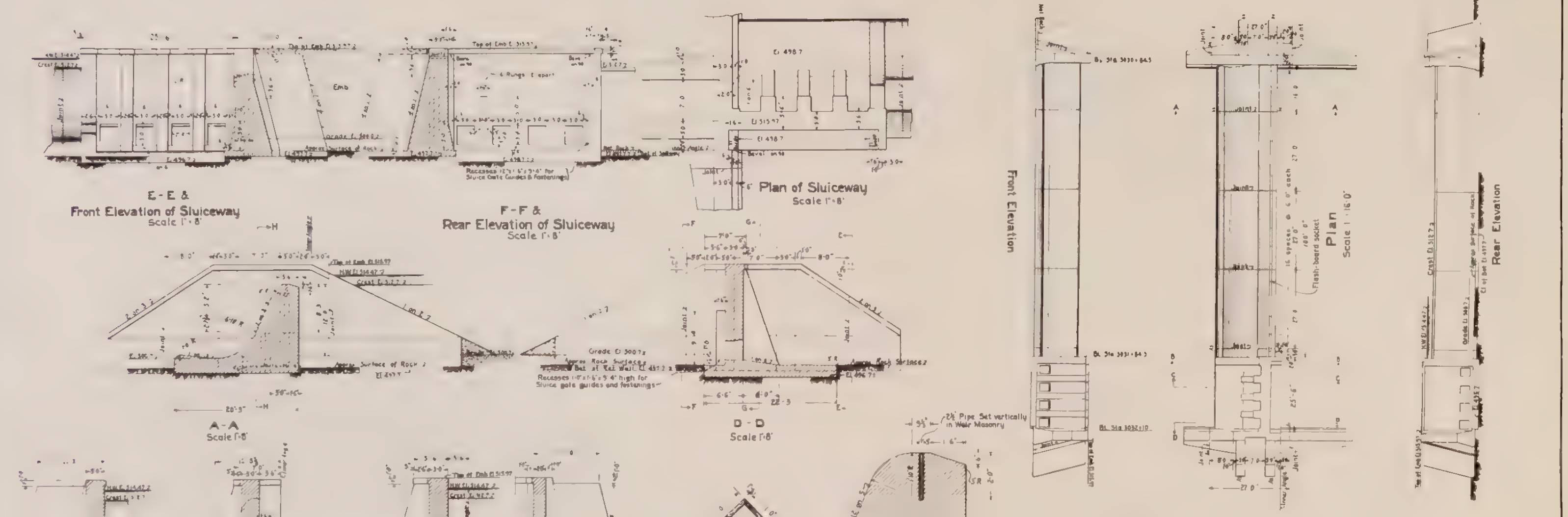


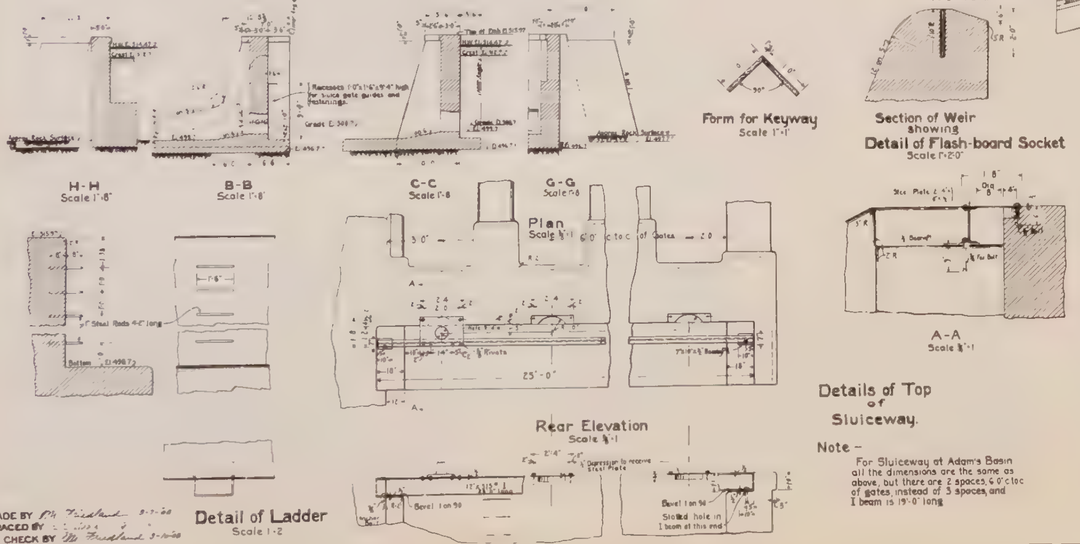
Looking West, Note new waste gate in foreground. Greece Weir

Looking East, Note road in front of weir.
Greece Weir

Canal Side, Looking East
Greece Weir

Canal Side, Looking West
Greece Weir





NOTES—

1. Use 2nd class concrete throughout
2. Joints and keyways shall be made watertight by painting them with a double coat of ~~asphalt~~ paint
3. The sections $A_1 A_2 A_3 A_4 A_5 A_6$ and $b_1 b_2 b_3 b_4 b_5 b_6$ shall be constructed as monoliths
4. Exposed edges of completed structures are to be rounded to a radius of 2" except where otherwise shown, and edges at joints are to be rounded to a radius of ½"
5. The inner slope of embankment is to be paved with 3rd class pavement, from Inner Angle to Bottom Angle, for 30 ft. from the face of the retaining wing wall on each side the weir
6. There are to be supplied for the gate openings on this drawing three rectangular sluice-gates and operating machinery. These gates are to be operated by hand under a head of 14 ft and are to be up to the standard of practice of manufacturers of recognized standing
7. The elevations of the bottoms of the structures shown on this drawing are approximate only, and may be ordered by the engineer to be placed at any elevation necessary for a proper foundation
8. Each spillway section is to be built as a monolith. Work once begun upon a monolith section is to be continued without interruption until the section is completed.

Details of Top of Sluiceway.

Note – For Sluiceway at Adam's Basin all the dimensions are the same as above, but there are 2 spaces, 6.0" c to c of gates, instead of 3 spaces, and I beam is 19'-0" long

Contract No. 60.

Erie Canal — Section 9.

Between South Greece and Adams Basin.

DETAIL PLAN FOR WASTE WEIR AT SOUTH GREECE STA. ~~3031+50~~ 3030+80

Scales as indicated.

Examined and approved
W R Hill
Special Deputy State Engineer.
Mar 18 1908

30

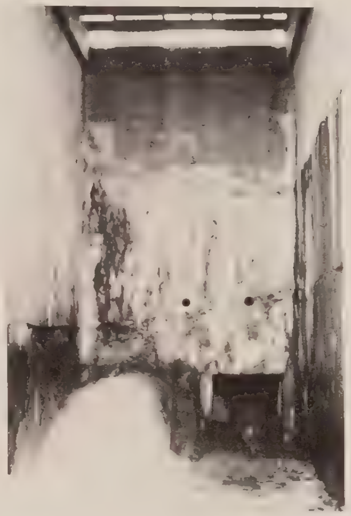
MADE BY R. H. Friedland 3-7-08
TRACED BY
1st CHECK BY W. Friedland 3-10-08
2nd CHECK BY

The Spencerport Waste Gate and Weir is located 1/4 mile east of Spencerport on the north side of the canal. A steel grate bridge carries the tow path over the waste gate and weir.

The 8½ foot wide waste gate or sluiceway has two openings. A small 5 foot high center buttress between the openings supports the 18 inch thick, 16 foot high, membrane wall. As shown on the plans, the main reinforcement for this thin wall is a series of 5/8 inch square reinforcing rods embedded in the north face of the membrane wall.

The bottom 10 feet of the membrane wall was heavily effloresced on the north or front side and some seepage of canal water through this section was evident. A cold joint ran horizontally across the wall 5 to 6 feet from the bottom. Approximately 70% of the wall was effloresced and 50% sounded delaminated. The top section of the wall appeared and sounded in good condition.

Cores #1 and 2, taken from the front of the gate, showed deterioration to a depth greater than 1 foot. Core #3, taken from the back or canal side of the gate, showed deterioration to a 6 inch depth. Although the lower sections of Cores #2 and 3 contained 1 or 2 small fractures, they had compressive strengths of 3225 and 5420 p.s.i., respectively.



North Side, Core Hole #1 (right) and #2 (left), Note joints across wall. Spencerport Waste Gate

Canal or South Side, Note cold joints across wall. Spencerport Waste Gate

In the middle 1960's State Maintenance Forces rebuilt the upper half of the weir and reconstructed the tow path bridge. Core #5, taken from a non-reconstructed area on the back side of the weir, contained deterioration 6 inches deep. Core #6, obtained from a reconstructed area on the front of the weir, showed no deterioration. Core #6 was taken through a vertical crack which extends the full length of the core. No water was leaking through this crack, but canal water was rising out of a small crack at the toe of the weir. Less than 5% of the weir exhibited any form of deterioration. Although it contained 1 or 2 small fractures, the middle section of Core #5 had a compressive strength of 6265 p.s.i.

South Side, Looking West, Note repairs to top half of weir. Spencerport Weir

North Side
Spencerport Weir

South Side, Looking East, Note repairs to top of weir and deteriorated east abutment.
Spencerport Weir

The west abutment exhibited large cracks on approximately 20% of its area. The majority of these cracks probably extend through the wall. Small cracks and efflorescence covered approximately 60% of the abutment surface and delaminations were detected on 40% of its surface. The south end of the west abutment (normally under water on canal side) had small areas of scaling and cracks along the top, but few delaminations were detected on the front surface.

The north half of the east abutment had cracks and efflorescence on approximately 90% of its surface and scaling or delaminations on 60% of its surface. Core #7, taken from this wall on April 26, 1977, was located in a hollow sounding area with 1 foot deep scaled areas above and below the core hole. The core showed that deterioration extends over 2½ feet into the abutment. The south half of the east abutment (normally under water on canal side) had two long, horizontal, deep scale areas. The remainder of the surface contained few delaminations, but Core #4 showed deterioration to a depth of 5 inches.

The surface of the tow path bridge pier was 60% covered with cracks and efflorescence, 30% scaled and 25% delaminated.

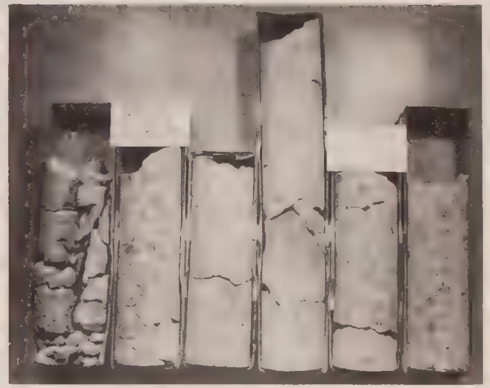
CONCLUSION

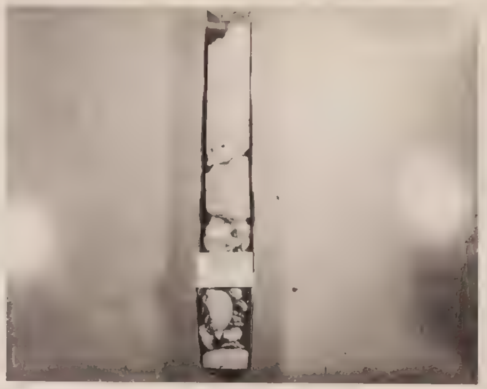
The depth of concrete deterioration in the waste gate membrane wall, although reinforced, indicates that this part of the water control structure should be rebuilt now. Both abutments and the bridge pier also need to be repaired or replaced. The weir is in good condition and no additional work is anticipated for this part of the structure.

East Abutment
Spencerport Weir

Looking West, East Side of Pier
and Wingwall of West Abutment.
Spencerport Waste Gate and Weir

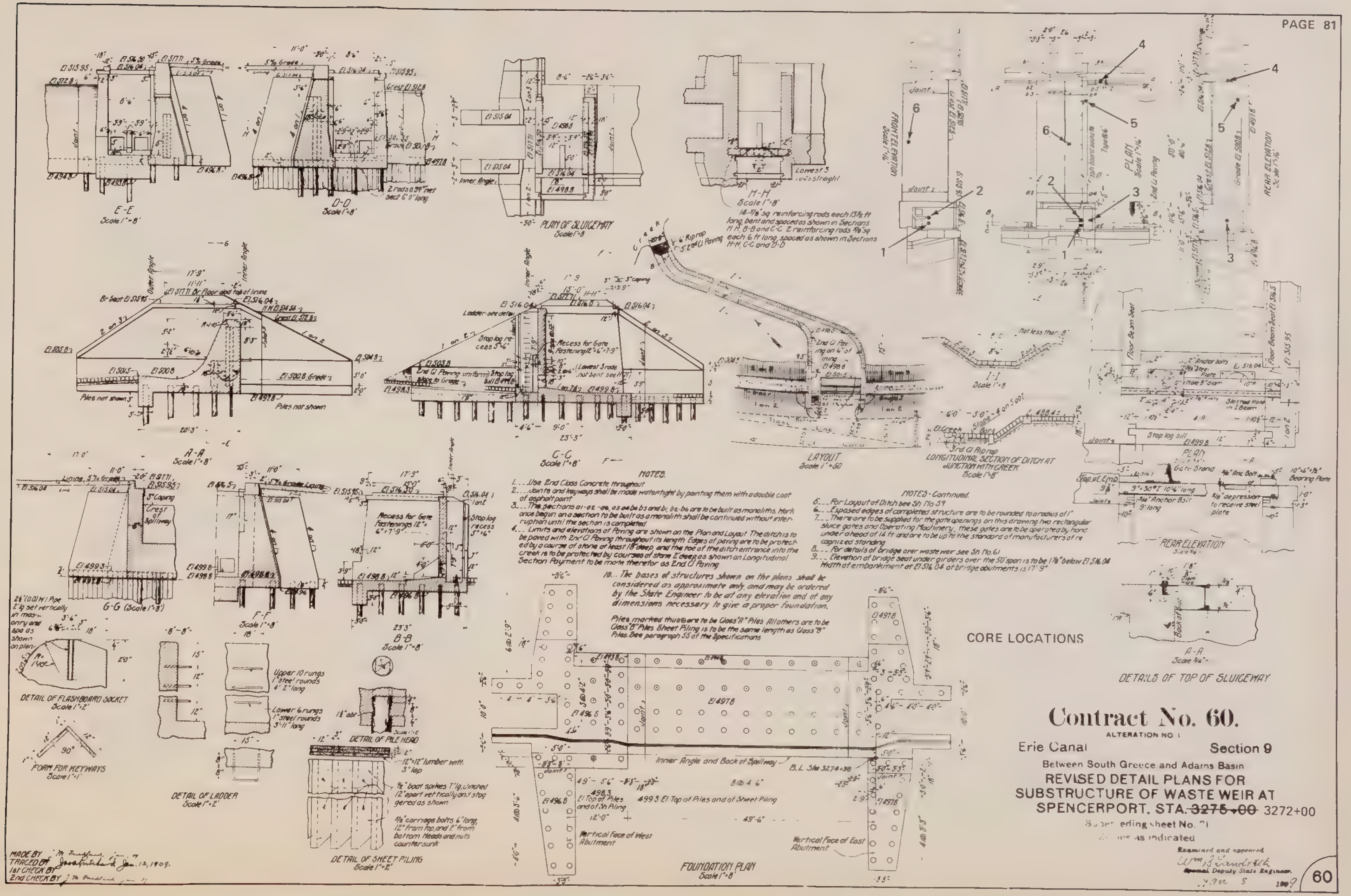
West Abutment
Spencerport Waste Gate





SPENCERPORT WEIR AND WASTE GATE

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	Waste Gate, North Side, 2' From West Abutment, 6' Above Floor	0	12½"	0	12½"	12½"	Cored through cold joint. Deeper deterioration exists.
2	Waste Gate, North Side, Center of Wall Panel, 6' Above Floor	0	12"	0	13½"	13½"	Taken above cold joint, heavy efflorescence.
3	Waste Gate, South (Canal) Side, Center of Wall Panel, 7' From Bottom	0	6"	At 5"	13"	13"	
4	East Abutment, Canal Side, 5' From Weir, 4' From Bottom	0	5"	At 9"	21"	21"	
5	Weir, South (Canal) Side, 6' From East Abutment, 3' From Bottom	0	6"	At 10"	12"	12"	
6	Weir, North Side, Center of Weir, 2' From Bottom	0	0	0	12"	12"	Cored through vertical crack.
7	Center Of East Abutment North of Weir, 4' From Bottom	0	32½"	0	32½"	32½"	Area hollow and scaled up to 1" deep above and below core hole. Deeper deterioration exists.



NOTES.

1... Use 2nd Class Concrete throughout
2.... Joints and keyways shall be made watertight by painting them with a double coat of asphalt paint
3... The sections a1-a2-a6, a5 a6 b1 b5 and b1 b2-b6 are to be built as monoliths. Work once begun on a section to be built as a monolith shall be continued without interruption until the section is completed
4... Limits and elevations of Paving are shown on the Plan and Layout. The ditch is to be paved with 2nd Cl Paving throughout its length. Edges of paving are to be protected by a course of stone at least 18" deep, and the toe of the ditch entrance into the creek is to be protected by courses of stone 2' deep as shown on Longitudinal Section. Payment to be made therefor as 2nd Cl Paving

NOTES - Continued.

5... For Layout of Ditch see Sh No 59
6... Exposed edges of completed structure are to be rounded to a radius of 1"
7... There are to be supplied for the gate openings on this drawing two rectangular sluice gates and Operating Machinery, these gates are to be operated by hand under a head of 14 ft and are to be up to the standard of manufacturers of recognized standing
8... For details of bridge over waste weir see Sh No. 61
9... Elevation of bridge seat under girders over the 50' span is to be 1⅞" below El 516.04. Width of embankment at El 516.04 at bridge abutments is 17' 9"
10... The bases of structures shown on the plans shall be considered as approximate only, and may be ordered by the State Engineer to be at any elevation and of any dimensions necessary to give a proper foundation.

Piles marked thus ⊕ are to be Class "A" Piles. All others are to be Class "B" Piles. Sheet Piling is to be the same length as Class "B" Piles. See paragraph 55 of the Specifications

Contract No. 60.

ALTERATION NO 1

Erie Canal — Section 9

Between South Greece and Adams Basin

REVISED DETAIL PLANS FOR SUBSTRUCTURE OF WASTE WEIR AT SPENCERPORT. STA. ~~3275+00~~ 3272+00

Superseding sheet No. [illegible]

Scales as indicated

Examined and approved
Wm. B. Landreth
Special Deputy State Engineer.
Jan 5 1909

MADE BY M. Eastland
TRACED BY [illegible] Jan. 12, 1909.
1st CHECK BY
2nd CHECK BY M. Eastland

ADAMS BASIN WEIR AND WASTE GATE

The Adams Basin Waste Gate and Weir is located just west of Adams Basin on the south side of the canal. Most of the waste gate and weir has been covered with shotcrete on both sides. This shotcrete was loosely bonded to the old surface and about half has fallen off the weir.

The waste gate has three sluice gate openings and two buttresses to reinforce the membrane wall. The shotcrete coating made it difficult to sound the structure and detect delaminations. Sounding of areas not covered with shotcrete revealed some delaminations. Cores #1 and #3 were taken in areas of the membrane wall which represent typical conditions. These cores showed deterioration to 10 and 7 inches, respectively. The lower section of Core #1 had a compressive strength of 4030 p.s.i. even though it contained 1 or 2 small fractures.

Core #2, taken in a typical area of a buttress, showed deterioration existed to a depth of 4 inches. However, close examination of the sloping buttress faces indicated that deterioration existed here to an approximate depth of 12 inches.

South Side, Note Core Holes #1 and 3
Adams Basin Waste Gate

Canal Side
Adams Basin Waste Gate

Approximately half of the shotcrete placed on the front of the weir has fallen off and most of the remaining shotcrete was only loosely bonded. The exposed concrete surface was lightly scaled with about 25% of the concrete being delaminated. Water seeping from beneath the shotcrete was most likely coming from the crest of the weir where the top 2 feet appeared to be deteriorated. Scattered vegetation was growing along the crest of the weir. Core #4, taken from the front of the weir, indicated deterioration to 8 inches in this delaminated area. The lower section of Core #4 had a compressive strength of 3640 p.s.i.

The east abutment, not covered with shotcrete, was approximately 75% cracked and exhibited efflorescence. Delaminated areas existed on over half of the surface. At one time, the west abutment was completely covered with shotcrete, but 25% has now fallen off. The exposed concrete sounded delaminated, and 50% of this exposed surface was cracked and effloresced.

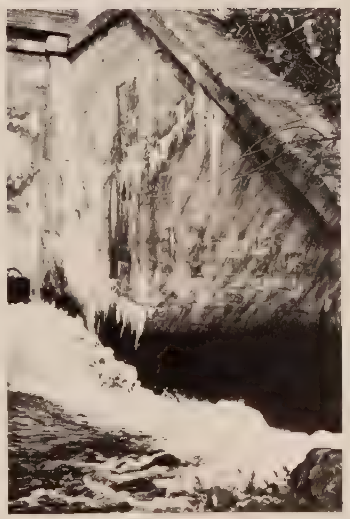
South Side, Note missing shotcrete and vegetation along crest.
Adams Basin Weir

Canal Side, Note repairs along crest
Adams Basin Weir

Conclusions

Since the shotcrete placed on the existing concrete was only loosely bonded, and in some areas had fallen off, we believe that this cosmetic method of repair has little merit. In all cases, it has hindered the evaluation of the structures.

Cores taken from this structure indicate deterioration exists from 4 to 10 inches in depth. We believe that similar deterioration exists in the abutment walls and that the weir crest needs replacement. Repair procedures would include chipping deteriorated concrete until sound concrete is reached and then encasing the structure in new concrete to prevent further deterioration.

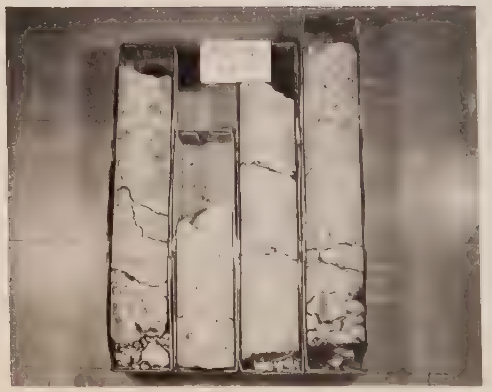


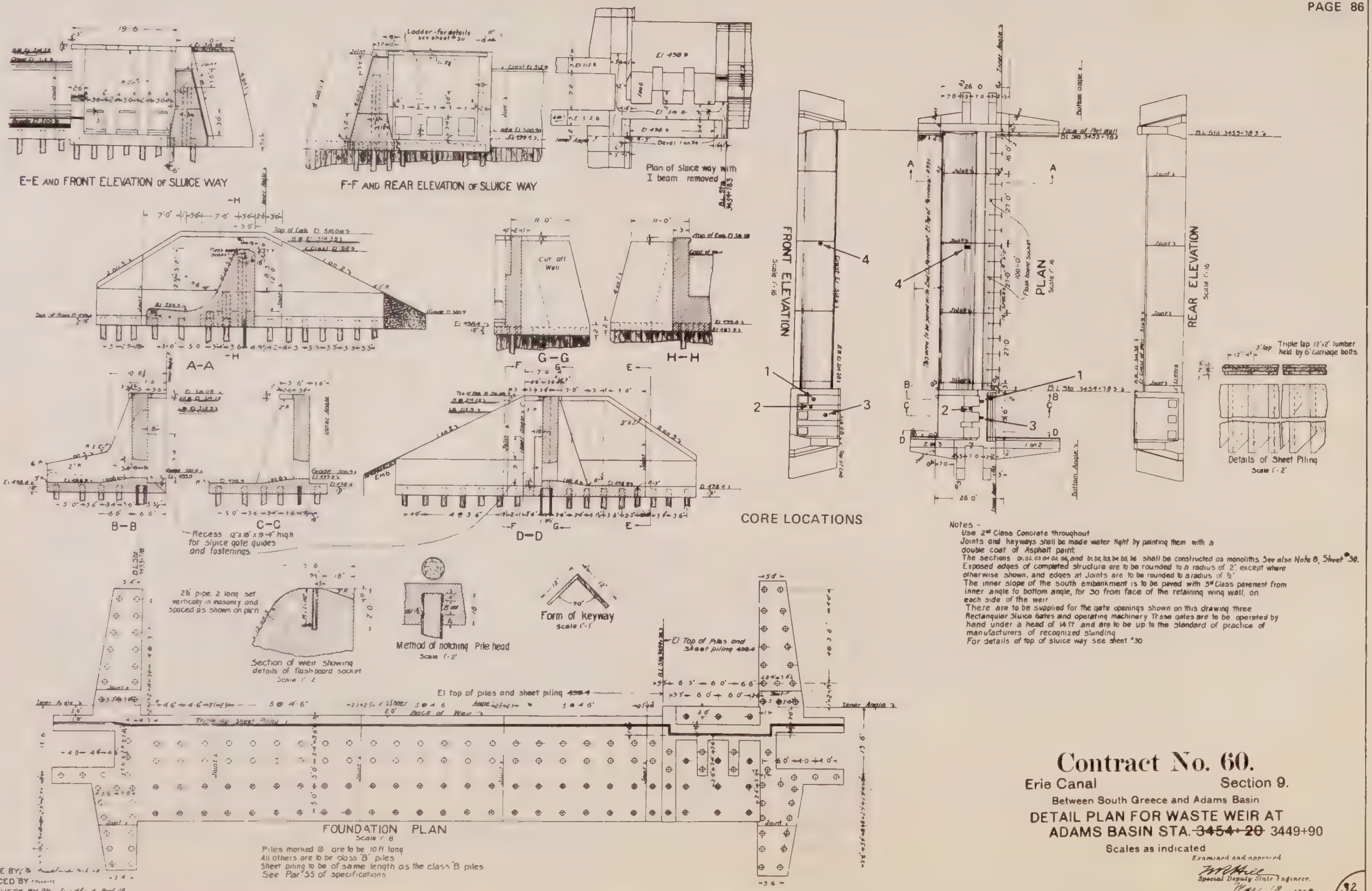
East Abutment
Adams Basin Waste Gate

North or Canal Side
Note repairs along top of weir.
Adams Basin Weir

ADAMS BASIN WEIR AND WASTE GATE

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	Waste Gate, South Side, Center of West Panel, 5½' Above Floor	0	10"	0	21"	21"	Entire area shotcreted.
2	Waste Gate, South Side, West Side of West Buttress, 3' From Panel Wall, 4½' Above Floor	0	4"	0	11½"	11½"	Entire area shotcreted.
3	Waste Gate, South Side, Center of Middle Panel, 8' Above Floor	0	7"	At 13"	19½"	19½"	Entire area shotcreted.
4	Weir, South Side, 55' From East End, 6' Above Floor	1"	8"	At 14"	21"	22"	Entire area shotcreted; 50% has fallen off.





Notes -

Use 2nd Class Concrete throughout

Joints and keyways shall be made water tight by painting them with a double coat of Asphalt paint.

The sections a1, a2, a3, a4, a5, a6, and b1, b2, b3, b4, b5, b6 shall be constructed as monoliths. See also Note 8, Sheet #30.

Exposed edges of completed structure are to be rounded to a radius of 2", except where otherwise shown, and edges at Joints are to be rounded to a radius of ½"

The inner slope of the south embankment is to be paved with 3rd Class pavement from inner angle to bottom angle, for 30 from face of the retaining wing wall, on each side of the weir

There are to be supplied for the gate openings shown on this drawing three Rectangular Sluice Gates and operating machinery. These gates are to be operated by hand under a head of 14 ft and are to be up to the Standard of practice of manufacturers of recognized standing

For details of top of sluice way see sheet #30

Contract No. 60.

Erie Canal — Section 9.

Between South Greece and Adams Basin

DETAIL PLAN FOR WASTE WEIR AT ADAMS BASIN STA. ~~3454+20~~ 3449+90

Scales as indicated

Examined and approved
Special Deputy State Engineer.
May 18 1908

MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY

32

BROCKPORT WEIR AND WASTE GATE

The Brockport Waste Gate and Weir is located in Brockport on the north side of the canal. A new steel grate bridge was constructed in the middle 1960's by State Maintenance Forces to replace the original tow path bridge. Also, the easternmost sluice gate was removed and the gate opening was sealed with concrete.

The waste gate and buttress walls appeared to be in very good condition. Less than 5% of its surface was scaled or delaminated. Core #1, taken from a typical area in the membrane wall, revealed no deterioration. This core had a compressive strength of 4185 p.s.i.

The weir exhibited scaling 1 to 2 inches in depth over approximately 10% of its area. Sounding revealed delaminations covering less than 5% of its surface. Core #2, taken in a typical weir area, revealed no deterioration of the concrete, but the concrete was cracked about 5 inches below the surface.

North Side, Note core holes #1 and 2
Brockport Weir and Waste Gate

Canal Side
Brockport Weir and Waste Gate

Both abutments were in good condition with scaled or delaminated areas covering less than 5% of the surface area.

Conclusion

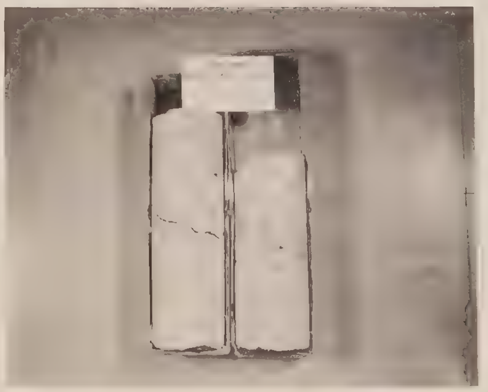
The waste gate, weir, and abutments were in very good condition. No repair work is presently anticipated.

East Abutment
Brockport Weir

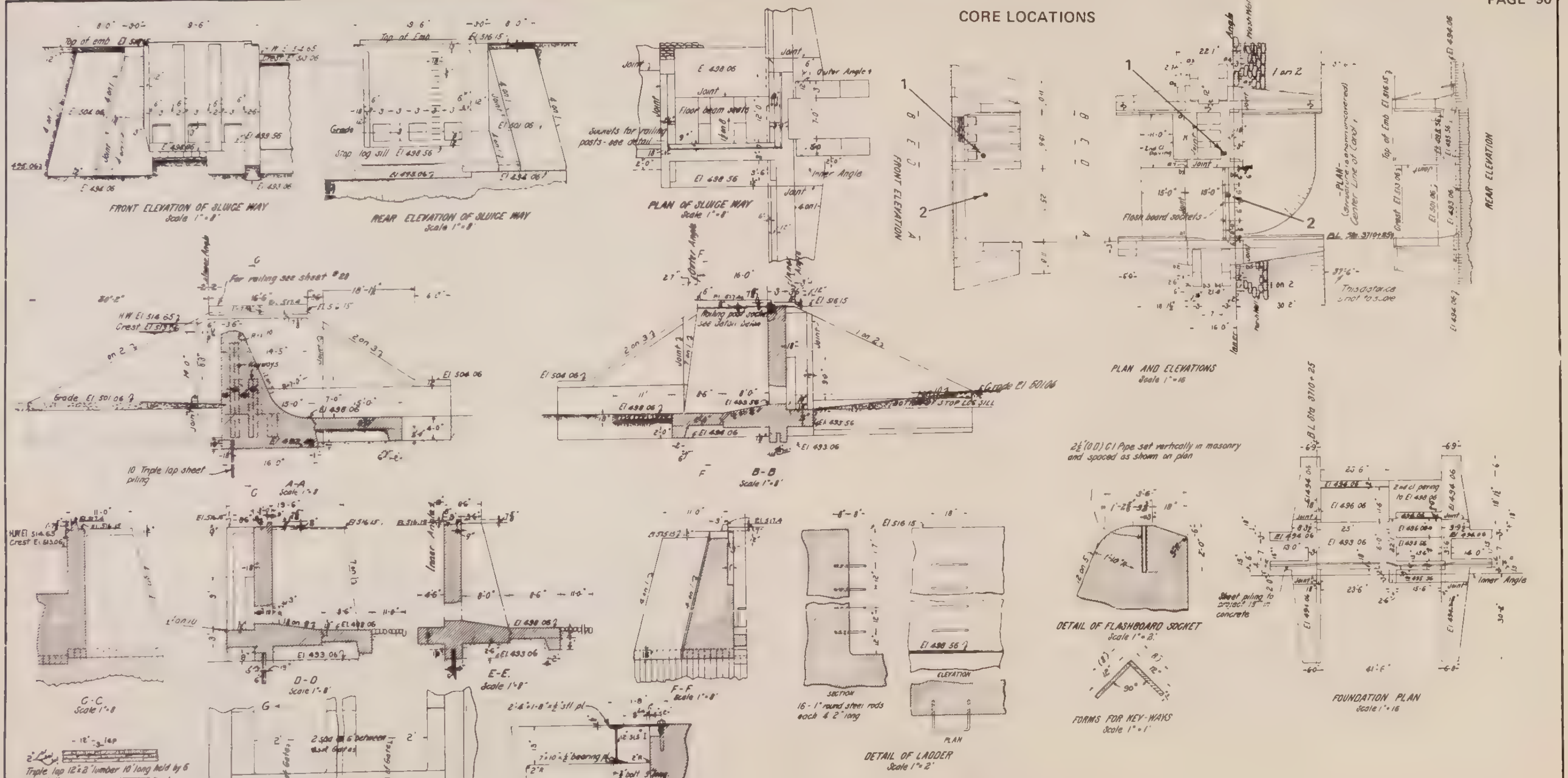
West Abutment
Brockport Weir

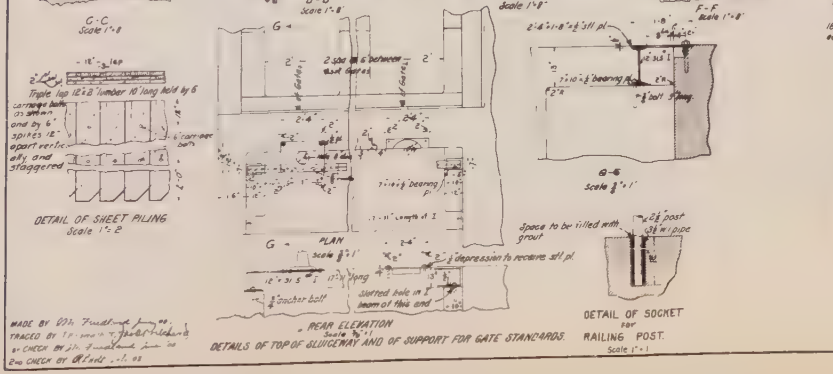
BROCKPORT WEIR AND WASTE GATE

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	Waste Gate, North Side, Center of West Panel, 5' Above Floor	0	0	At 6"	13"	13"	
2	Weir, North Side, 15' From West Abutment, 6' Above Bottom	0	0	0	10"	10"	Core cracked at 5".



CORE LOCATIONS





NOTES

The elevations of the bottoms of the structures shown on this sheet are approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.

All concrete to be second class

All exposed edges of completed structures to be rounded to a radius of 1" except where otherwise shown. Edges at joints to be rounded to a radius of ½"

The sections $a_1 a_2 a_3 \ldots a_4$ not including the slab K, and $b_1 b_2 b_3 \ldots b_4$ not including the slab L, are to be built as monoliths. Work once begun on a section built as a monolith shall be continued without interruption until the section is completed.

There are to be supplied for the gate openings shown on the drawing three rectangular sluice gates, and operating machinery. The gates are to be operated by hand under a head of 15 feet and are to be up to the standard of manufacturers of recognized standing.

For details of bridge over Waste Weir see sheet #28

Contract No. 61.

Erie Canal — Section 9.

Between Adams Basin and west line of Monroe County.

DETAIL PLANS OF WASTE WEIR AT BROCKPORT

STA. ~~3710+25~~ 3706+30

Scales as indicated.

Examined and approved

Special Deputy State Engineer.

27

HOLLEY WEIR AND WASTE GATE

The Holley Waste Gate and Weir is located east of Holley on the south side of the canal at the east end of the Holley Trough. This waste gate is unique since energy dissipator pools are located below the sluice gate outlets. The weir extends east of the waste gate.

The waste gate membrane wall exhibited scaling, efflorescence, and delaminations covering 90% of its south side. Cores #4 and 5, taken from the south side of the membrane wall, indicated deterioration to 6 and 9 inches, respectively. The north side of the membrane wall exhibited deep cracking. Core #7, taken from the north side of this wall, indicated deterioration deeper than 11 1/2 inches. The buttresses were scaled along their outer edges, but for the most part appeared sound. Core #6, taken from a center buttress in a typical area, indicated deterioration to 3 inches. Although both cores had 1 or 2 small fractures, Cores #4 and #6 had compressive strengths of 4040 and 3600 p.s.i., respectively.

South Side, Note energy dissipation pool in foreground. Holley Waste Gate

South Side
Holley Weir

Canal or North Side
Holley Waste Gate

Canal Maintenance Forces have repaired the top of the east abutment and the crest of the weir. Most of the south side of the weir exhibited scaling and delaminations. Core #1, from the south side of the weir, indicated deterioration existed to a 18 inch depth. The north side exhibited deep cracking. Core #3, from the north side of the weir, indicated deterioration deeper than 21 inches.

The south half of the east abutment wall was cracked or delaminated over approximately half of its surface. Core #2, taken from this abutment, indicated deterioration to 18 inches. The north half of the east abutment wall exhibited deep scaling along its lower section. The west abutment was mostly sound.

CONCLUSION

Deterioration 6 to 12 inches in depth exists over most of the waste gate membrane wall. Deterioration approximately 3 inches in depth exists along the sides of the buttresses and deeper deterioration exists on the end faces of the buttresses.

Although deep deterioration exists on both sides of the weir, the massiveness of the weir provided for a generally sound structure. Deep deterioration also exists in the east abutment.

Repairs to all structure components should include removal of unsound concrete and bonding new concrete to sound concrete surfaces.

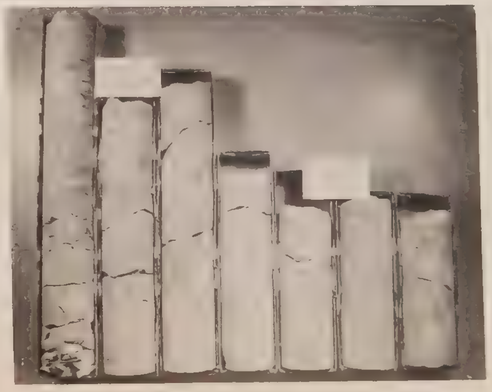
Canal Side, Note repairs to weir crest and top of east abutment.
Holley Waste Gate and Weir

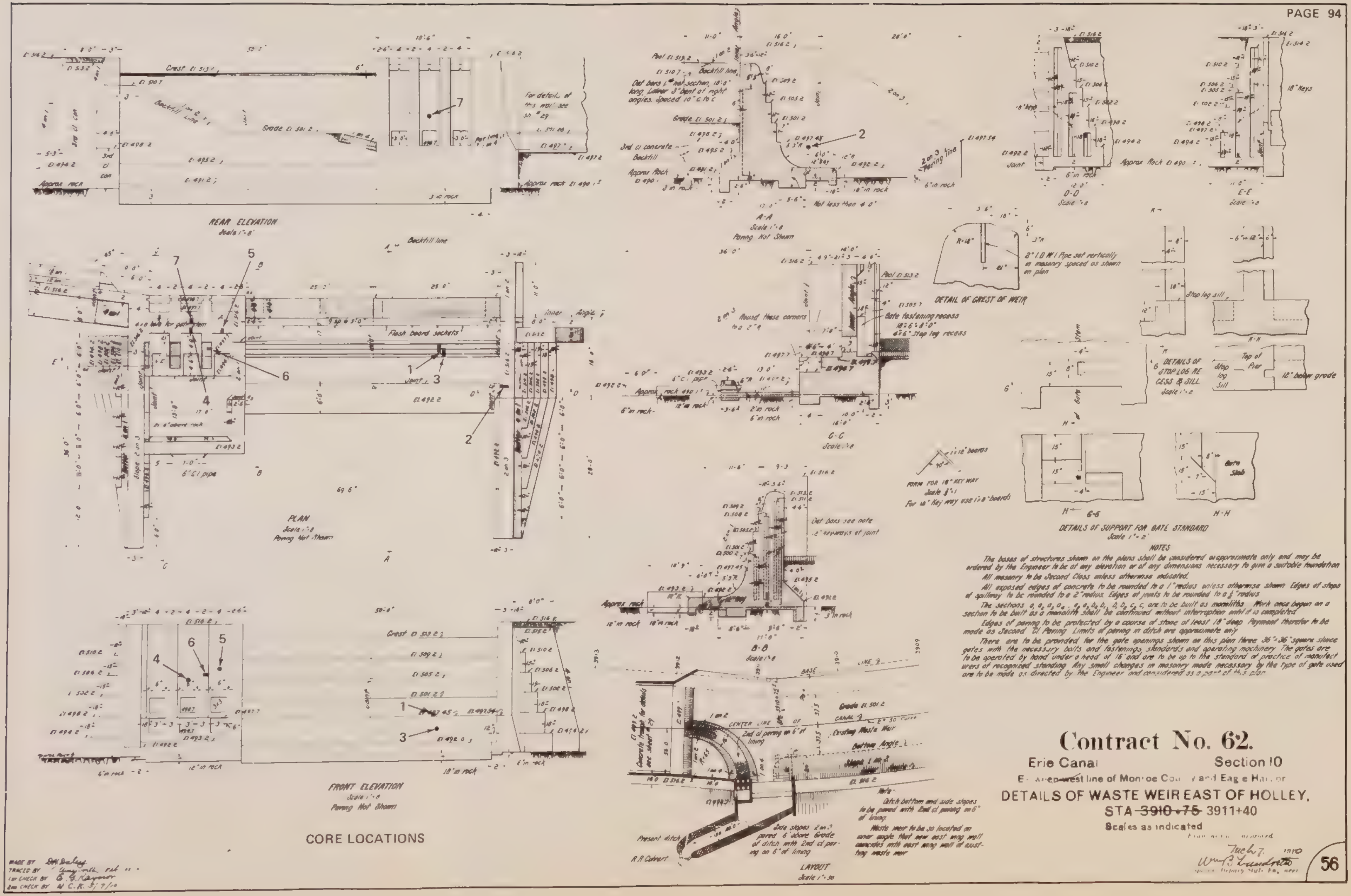
East Abutment
Holley Weir

West Abutment
Holley Waste Gate

HOLLEY WEIR AND WASTE GATE

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	Weir, South Side, 13' From East Abutment, 6' From Bottom	0	18"	At 22"	26"	26"	
2	East Abutment, 6' From South Side of Weir, 4' From Bottom	0	18"	At 12"	20"	20"	
3	Weir, North Side, 12' From East Abutment, 3' From Bottom	0	21"	At 9" and 16"	21"	21"	Deeper deterioration exists.
4	Waste Gate, South Side, Center of West Panel, 7' Above Bottom	0	6"	At 11"	14½"	14½"	Heavy efflorescence, sounds hollow.
5	Waste Gate, South Side, Center of East Panel, 9' Above Bottom	0	9"	0	12"	12"	Heavy efflorescence, sounds hollow.
6	Waste Gate, South Side, East Center Buttress, Center of East Side, 8' Above Bottom	0	3"	0	12½"	12½"	Crack extends length of core, sounds solid.
7	Waste Gate, North (Canal) Side, Center of Middle Panel, 7' Above Bottom	0	11½"	At 6"	11½"	11½"	Sounds hollow. Deeper deterioration exists.





NOTES

The bases of structures shown on the plans shall be considered approximate only and may be ordered by the Engineer to be at any elevation or of any dimensions necessary to give a suitable foundation.

All masonry to be Second Class unless otherwise indicated.

All exposed edges of concrete to be rounded to a 1" radius unless otherwise shown. Edges of steps of spillway to be rounded to a 2" radius. Edges at joints to be rounded to a ½" radius.

The sections $a_1\ a_2\ a_3\ a_4\ .\ a_5\ a_6\ b_6\ b_1\ .\ b_1\ b_2\ c_1\ c_2$ are to be built as monoliths. Work once begun on a section to be built as a monolith shall be continued without interruption until it is completed.

Edges of paving to be protected by a course of stone at least 18" deep. Payment therefor to be made as Second Cl. Paving. Limits of paving in ditch are approximate only.

There are to be provided for the gate openings shown on this plan three 36"x36" square sluice gates with the necessary bolts and fastenings, standards and operating machinery. The gates are to be operated by hand under a head of 16' and are to be up to the standard of practice of manufacturers of recognized standing. Any small changes in masonry made necessary by the type of gate used are to be made as directed by the Engineer and considered as a part of this plan.

Contract No. 62.

Erie Canal — Section 10

E... west line of Monroe Co... and Eag e Har..or

DETAILS OF WASTE WEIR EAST OF HOLLEY,

STA ~~3910+75~~ 3911+40

Scales as indicated

Mch 7. 1910

Wm B Landreth

56

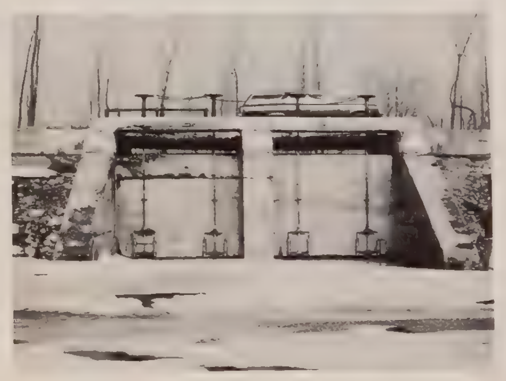
BROCKVILLE WEIR AND WASTE GATE

The Brockville Waste Gate is located east of State Route 387 on the north side of the canal. This structure is a combination waste gate and weir as high water is allowed to run over the membrane wall of the waste gate. The buttress at the center of the membrane wall also serves as a pier to support the concrete slab tow path bridge over the structure. Four sluice gates are located in the membrane wall. Three 7 foot 8 inch by 4 foot high box culverts (Culvert #71) are under this structure.

The membrane wall appeared in good condition and sounding revealed no delaminations. A core taken from the membrane wall confirmed the good condition of the wall. This core had a compressive strength of 8870 p.s.i. The buttress exhibited deterioration along its outer edges, but the remaining 90% of the pier was in good condition.

Looking West, Note partially missing railing. Brockville Waste Gate and Weir

Looking South
Brockville Weir and Waste Gate



Canal Side, Looking North
Brockville Waste Gate and Weir

The slab supporting the gate valve standards contained deterioration in the form of scaling or cracking over approximately 15% of its surface. Both abutments exhibited cracking or efflorescence covering about 20% of their surfaces, but basically they were sound.

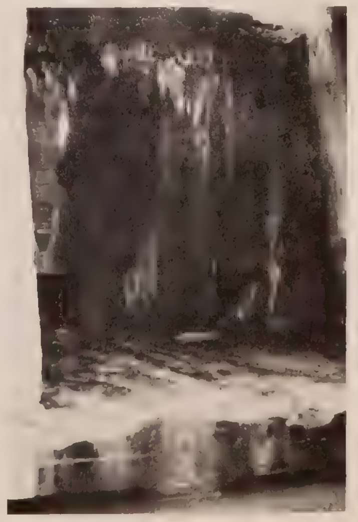
Approximately two-thirds of the tow path bridge railing was missing. This railing should be replaced.

CONCLUSION

Deterioration in this structure is confined to scaling and cracking along the edges of the slabs and pier. Repairs to these areas are recommended.

East Abutment
Brockville Weir

East Half, Note Culvert 71 exits under slab in foreground. Brockville Weir

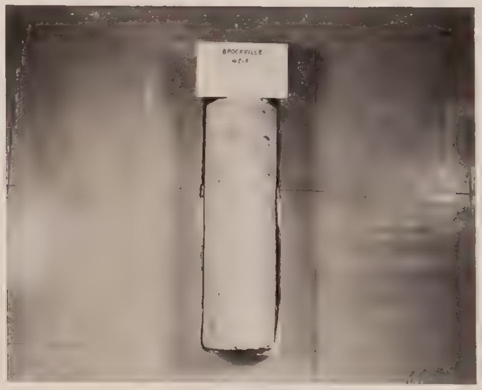


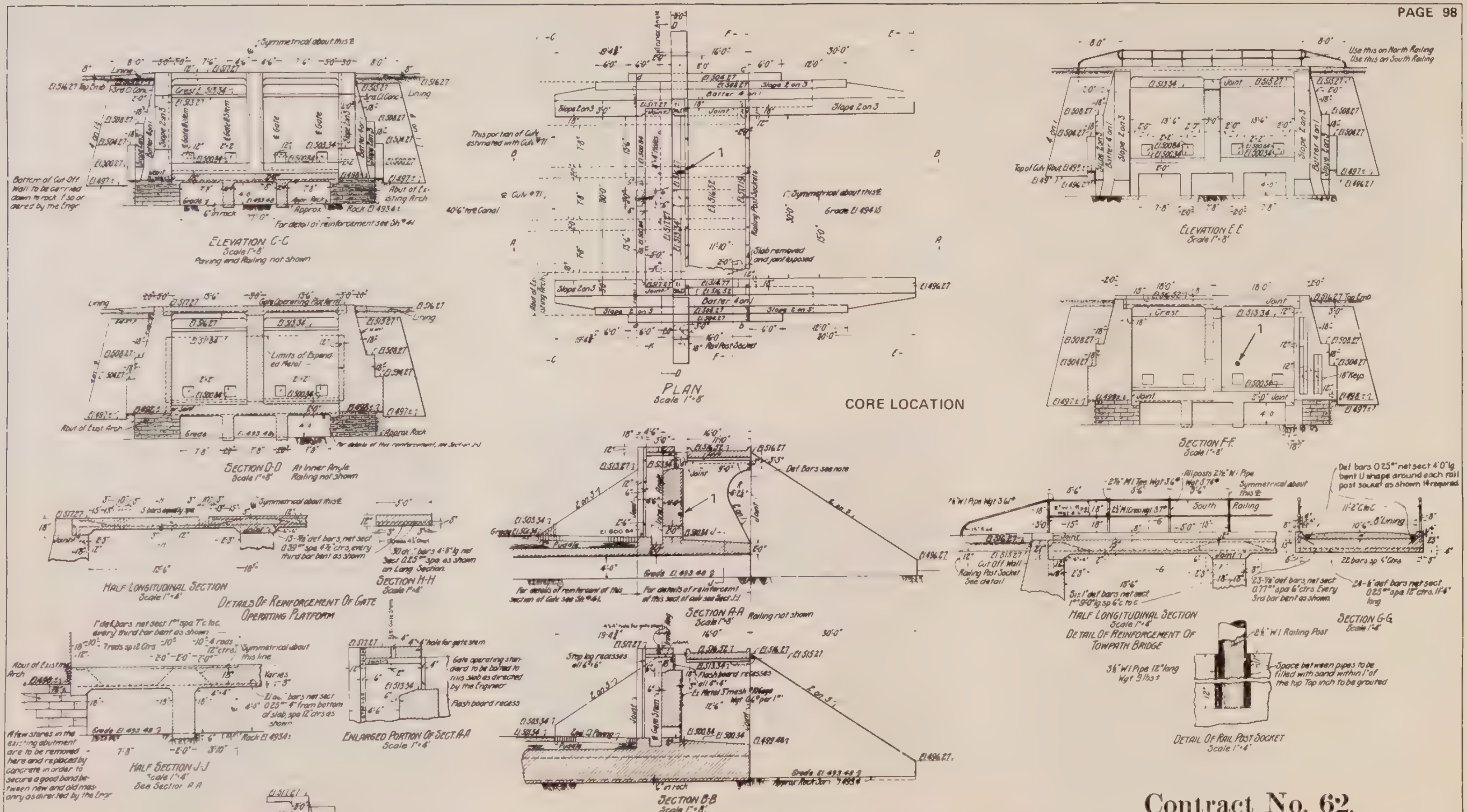
West Half, Note Culvert 71 exits under slab in foreground. Brockville Weir

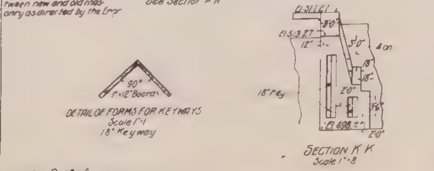
West Abutment
Brockville Weir

BROCKVILLE WEIR AND WASTE GATE

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	Weir and Waste Gate, North Side, 3' West of Center Buttress and Pier, 4½' Above Floor	0	0	0	13"	13"	Cored thru joint.







NOTES.

All masonry shown on this plan to be 2nd Cl Concrete except gate operating platform, towpath bridge and culvert roof, which are to be classed as 2nd Cl Reinforced Concrete, and cut off walls which are to be 3rd Class Concrete.

The portion a-b-c-d shall be built as a monolith. Work once begun on a section to be built as a monolith shall be continued without interruption until the section is completed.

All exposed edges of concrete to be rounded to a 2" radius. Edges of joints to be rounded to a ½" radius.

The bases of structures shown on this plan are to be considerered as approximate only and may be ordered by the Engineer to be at any elevations or of any dimensions necessary to give a proper foundation.

The abutments of the existing arch culvert are to be used as foundations for the wing walls unless otherwise directed by the Engineer.

NOTES-CONTINUED

Wherever concrete is deposited on or against old masonry the surface of the latter is to be thoroughly cleaned and roughened to secure a good bond as directed by the Engineer. Payment therefor shall be included under 2nd Cl Concrete.

There are to be provided for the gate openings shown on this plan four 24"×24" sluice gates with non-rising stem and the necessary standards and operating machinery. The gates are to be operated by hand under a head of 13 ft and are to be up to the standard of practice of manufacturers of recognized standing. If any of the present gates are in suitable condition they shall be used as directed by the Engineer. See Special Specifications.

Edges of paving are to be protected by a course of stone at least 18" in thickness. Payment to be made therefor as 2nd Cl Paving.

For details of Culvert #71 see Sh #41.

Contract No. 62.

Erie Canal STA. 4151+75 Section 10

Between west line of Monroe County and Eagle Harb

DETAILS OF WASTE WEIR AT BROCKVILLE. NORTH END OF OLD CULVERT NO. 71

Scales

Mch 7 10
Wm B Landreth

MADE BY
TRACED BY
1ST CHECK BY
2ND CHECK BY

58

The Albion Waste Gate and Weir is located in Albion on the south side of the canal. Water discharged from the waste gate flows into Culvert 77, located directly beneath the waste gate. The weir is located over the waste gate and also extends west of the waste gate.

The original Barge Canal plans of the weir and waste gate show an existing masonry weir and waste gate. This masonry structure was faced on the back or canal side and capped with concrete. Later, the south side of the weir and waste gate was faced with concrete by Canal Maintenance Personnel.

A reinforced concrete slab extends over the top of the waste gate. Five openings are situated beneath the slab at the elevation of the canal water surface. The slab contained extensive scaling and delaminations along the edges. The pedestals upon which the waste gate valve standards rest also contained extensive deterioration.

Looking West
Albion Weir

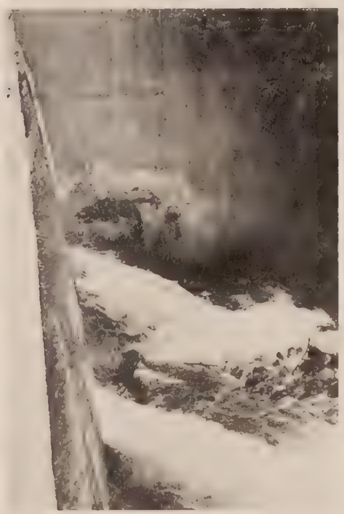
Albion Waste Gate and Culvert 77
Entrance After Cleaning Out, 1976
Note Core Hole #1

Canal Side
Albion Waste Gate and Weir

Looking East, Note old dry dock valves
and pipeline pedestals partially hidden
by vegetation. Albion Weir

Three of the 4 sluice gate openings in the waste gate are located directly over Culvert 77. The 4th sluice gate discharged into an old canal drydock area which was abandoned and walled off before the Barge Canal was built. This sluice gate is plugged with concrete and inoperative. Soundings along the upper south side of the waste gate revealed little delamination. Scaling, delamination and other deterioration existed in the vicinity of the sluice gate openings. Core #1, taken from the south side of the waste gate, revealed a sound facing 16 inches in depth, and an older concrete facing beneath it. Core #2, taken directly opposite of Core #1, on the canal side of the waste gate, indicated deterioration to 6 inches in depth.

The concrete which encases the weir was mostly sound. The west half of the weir (notch area) showed some distress along its upper portion where vegetation was observed growing. The east abutment appeared to be in very good condition. Little scaling or delamination was observed along this abutment.



East Abutment
Albion Weir

Albion Waste Gate and Culvert 77
Entrance, 1975

Recent Repairs on East Half of Weir
Albion Weir

The west abutment is stone masonry. A small stream of water was observed coming through this wall area which was hidden by dense vegetation.

CONCLUSION

The concrete encased masonry waste gate and weir are sound. An old mill foundation and the dry dock walls in front of the waste gate and weir make the structure appear to be in worse condition than it actually is. Future repairs should include repair or removal of the concrete slabs and valve standard pedestals. The deteriorated concrete around the 3 sluice gate openings should be removed and replaced with a durable concrete bonded to the existing structure. These repairs should be in conjunction with repairs to Culvert 77 which is directly underneath. Those sections of the weir which show deterioration should be removed and replaced with concrete.

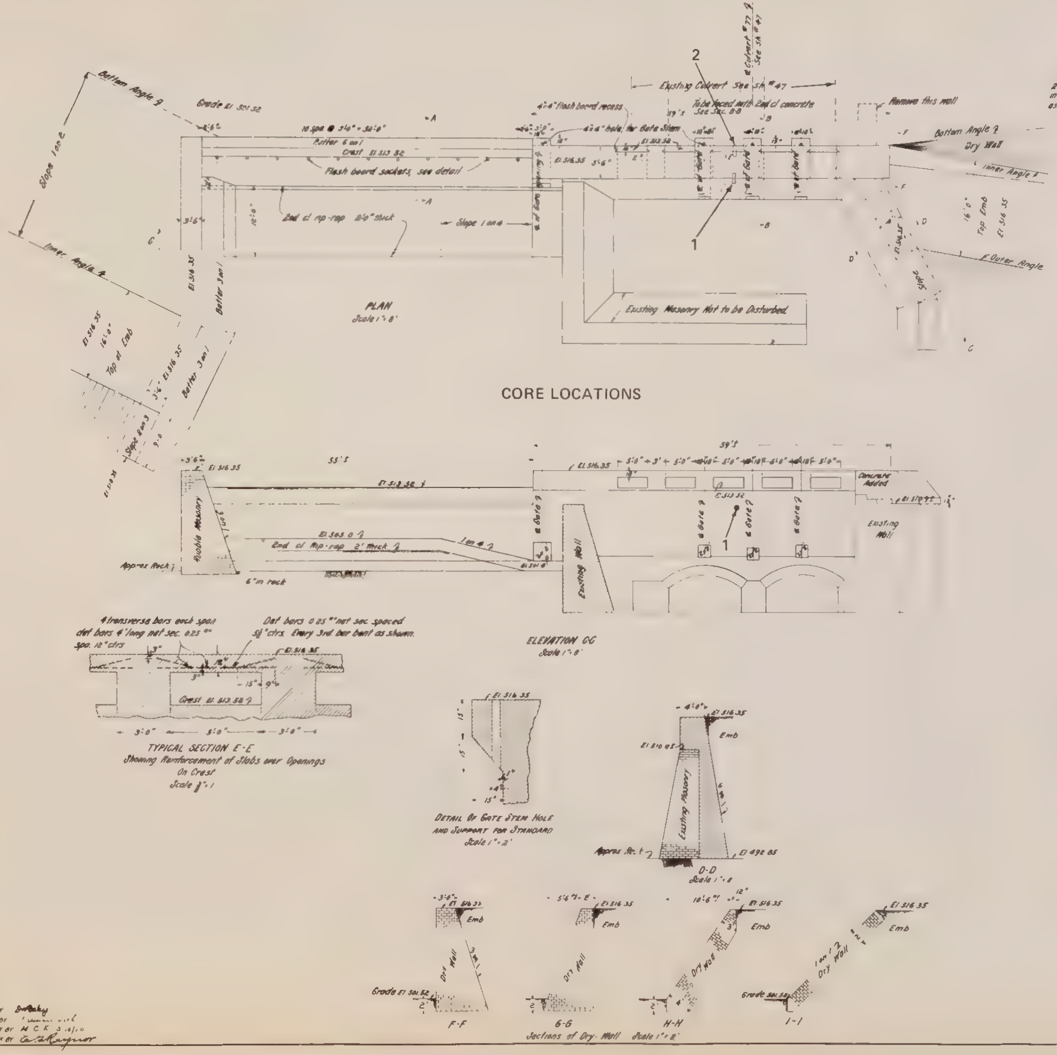
Albion Waste Gate Area
After Being Cleaned Out

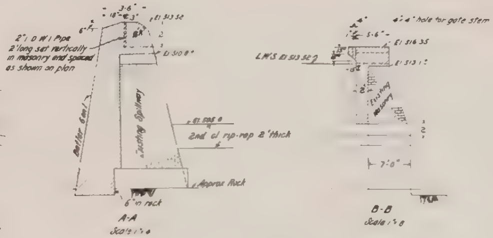
Old Dry Dock Valves, Note quantity of leak water coming out dark hole which comes through rubble wall at west end of Albion Weir

Stone Wall East of
Albion Waste Gate

ALBION WASTE GATE

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	Waste Gate, South Side, 18' From East Abutment, 5' Below Top of Wall	0	0"	At 10"	17"	17"	Newer concrete facing, into old concrete at 16". comp. str. 3515 psi
2	Waste Gate, North (Canal) Side, 18' From East Abutment, 5' Below Top of Wall	0	6"	At 10"	20"	20"	comp. str. 7255 psi





NOTES

The existing waste weir is to be capped and faced with Second Class Concrete as shown by the plans or directed by the Engineer. At least one ¾" dowel 15" long is to be placed in every 9 sq ft of surface of old wall where adjoined by new concrete masonry. Dowels to penetrate 9" into old masonry.

All new masonry to be Second Class Concrete except west wing wall which is to be of rubble masonry laid in mortar

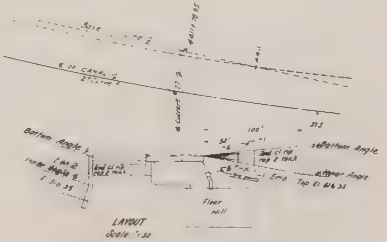
Exposed edges of concrete to be rounded to a 1" radius. Edges of joints to a ½" radius

All details not shown by this plan to be furnished by the Engineer

The same gate openings are to be maintained as exist in the present weir. There are to be supplied for these openings three 24"x24" sluice gates and one 36"x36" gate, together with standards and operating machinery and all necessary bolts and fastenings. All new gates furnished are to be up to the standard of practice of manufactures of recognized standing. The existing gates may be used if so directed by the Engineer. See special specifications

Any small changes in the masonry made necessary by the type of gate used are to be made as directed by the Engineer and considered a part of this plan

Any masonry in the existing weir found to be unsuitable to be left in the finished work shall be removed and replaced by Second Class Concrete as directed by the Engineer



Contract No. 62.

Erie Canal STA. 4411+50 Section 10

Between west line of Monroe County and Eagle Harbor.

DETAILS OF WASTE WEIR AT ALBION, AT SOUTH END OF OLD CULVERT NO. 77

Scales as indicated

Examined and approved

Special Deputy State Engineer

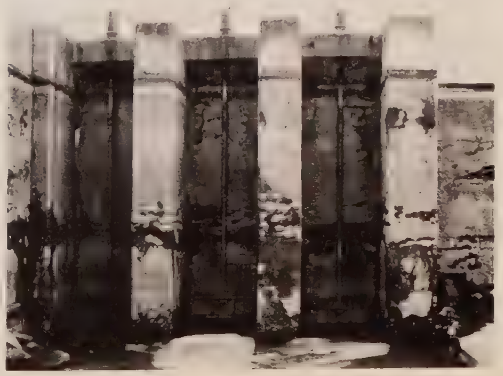
The Eagle Harbor Waste Gate and Weir is located east of Eagle Harbor on the south side of the canal. The waste gate membrane wall is supported by 3 buttresses, and 3 gate openings extend through the membrane wall. The weir extends 75 feet to the west of the waste gate.

As was found on other concrete structures along the canal, the front side of the waste gate and weir have been completely covered with shotcrete, making it difficult to visually inspect this portion of the structure. This shotcrete was from ¼ to ½ inch in thickness, and in most cases, was loosely bonded to the concrete.

Cores #1 and 3, taken from the membrane wall of the waste gate, indicated deterioration to 4 inches in depth. Cores #1 and 3 had compressive strengths of 5790 and 9175 p.s.i. respectively. A close examination of the buttresses indicated severe deterioration along their outer extremities. Core #2, which was cored into the end of a buttress and toward the membrane wall, revealed that the outer 2 feet of the buttresses were rubble.

Cores #4 and 5 were taken in typical areas from the front of the weir. These cores showed deterioration to 8 inches in depth.

South Side, Note core holes #1, 2 and 3, right to left. Eagle Harbor Waste Gate



Canal Side
Eagle Harbor Waste Gate

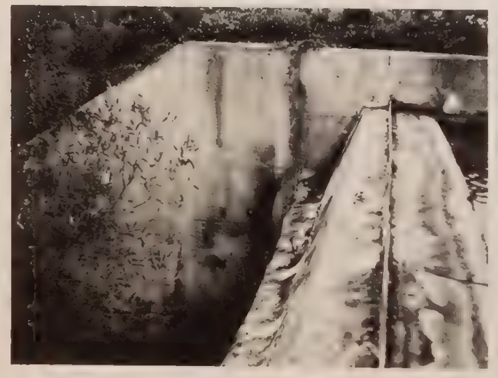
Canal Side, Note repairs along crest of weir. Eagle Harbor Weir and Waste Gate

Both abutments were covered with shotcrete, but soundings in areas where the shotcrete has fallen off indicated less than 10% of the surface delaminated.

Due to the canal being full of water at the time of coring, no cores were taken from the back side of the structure. Earlier visual examination, along with our experience with similar structures, indicated that the back side was in the same condition, if not better, as the front side.

CONCLUSION

Future repair work should include removal of the shotcrete and deteriorated concrete to sound material. The structure should then be encased in new concrete to prevent further deterioration.



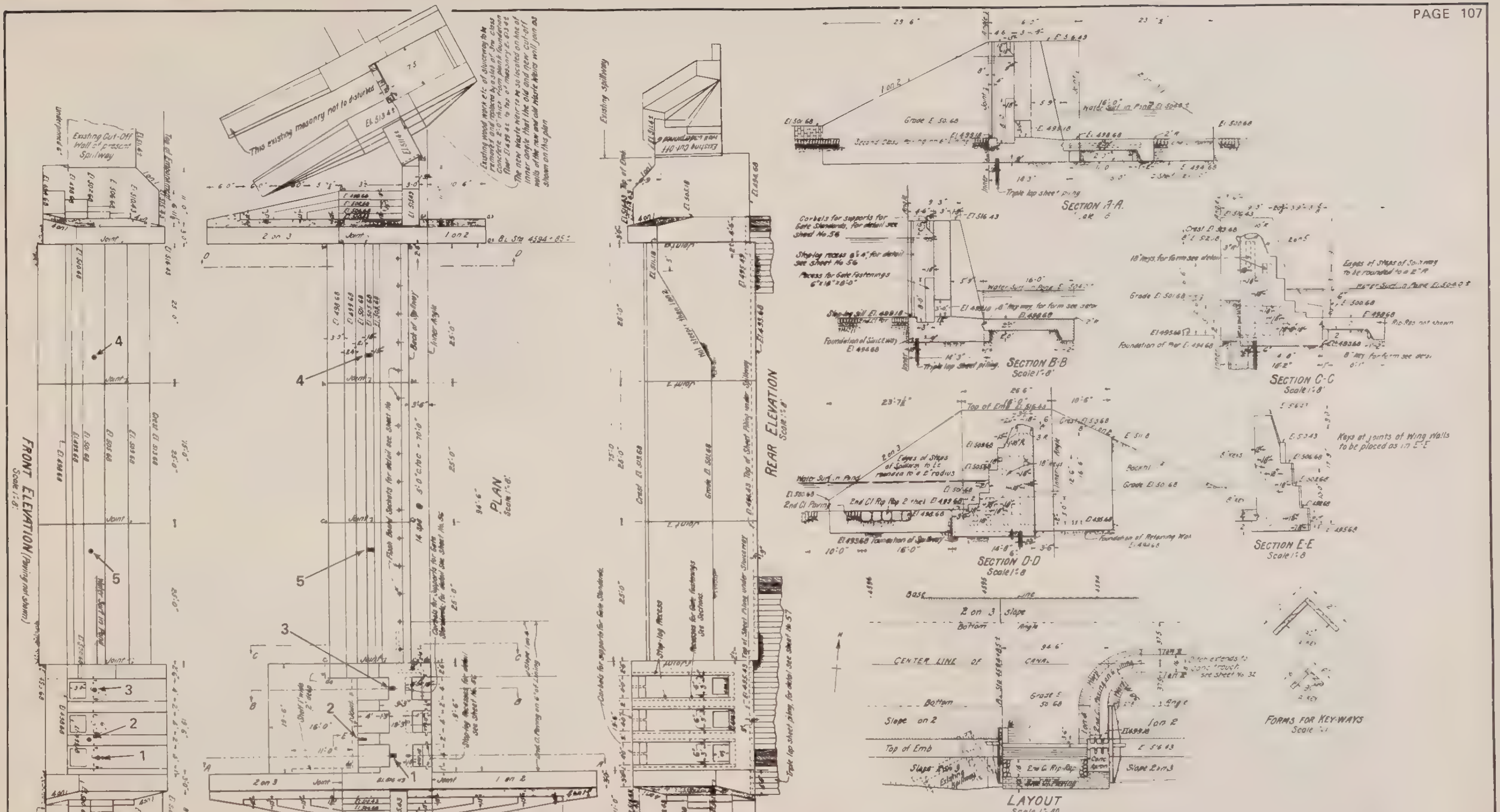
West Abutment
Eagle Harbor Weir

Looking West
Eagle Harbor Weir

Looking East
Eagle Harbor Weir

EAGLE HARBOR WEIR AND WASTE GATE

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	Waste Gate, South Side, Center of East Panel, 5½' Above Floor	0	4"	0	13"	13"	Area shotcreted.
2	Waste Gate, South Side, End of East Buttress, 4' Above Floor	0	23"	0	23"	23"	Area shotcreted, believe sound concrete at 23".
3	Waste Gate, South Side, Center of West Panel, 5' Above Floor	0	4"	0	12"	12"	Area shotcreted.
4	Weir, South Side, 20' From West Abutment, 5' From Bottom	0	8"	At 11"	12"	12"	Area shotcreted.
5	Weir, South Side, 20' From Waste Gate West Buttress, 4½' From Bottom	0	8"	At 10"	13½"	13½"	Area shotcreted.



CORE LOCATIONS

Sheet piling for this Weir to be 8' long.- for details see sheet No. 57
For details of Stop-log Recess and Sill, see sheet No. 56
" " " - Flash-board Sochel " " 56
" " " - Supports for Gate Standards, " " " 56
For limits of Rip-Rap and Paving see Layout
The limits of the 2nd Cl. Paving are to be protected by a course of stone at least 18" deep Payment therefor to be made as 2nd. Class Paving
Any slight changes in the masonry made necessary by the type of gates used shall be made as directed by the Engineer and considered a part of this plan

NOTES-

All masonry shown on this sheet is to be 2nd Class Concrete

Exposed edges of completed structures are to be rounded to a radius of One Inch, except where otherwise shown Edges of joints to be rounded to a radius of One-Half Inch

The sections [illegible] are to be built as monoliths Work once begun on a monolith shall be continued without interruption until the section is completed.

There are to be provided for the gate-openings shown on this sheet three 3'x3' gates and operating machinery The gates are to be operated by hand under a head of 16 feet, and are to be up to the standard of practice of manufacturers of recognized standing

The bases of structures shown on the plans are approximate only and may be ordered by the Engineer to be placed at any elevation or of any dimension necessary to give a proper foundation.

Contract No. 62.

Erie Canal — Section 10

Between west line of Monroe County and Eagle Harbor

DETAILS OF WASTE WEIR EAST OF EAGLE HARBOR, STA. ~~4594+85~~ 4593+90

Scales as indicated

Examined and approved

Mch 7, 1910

MADE BY J. M. Freeland & Bxtr
TRACED BY E.K. Gunn
1st CHECK BY E.K. Gunn
2nd CHECK BY E.J. Holland

MEDINA WEIR AND WASTE GATE

The Medina Waste Gate and Weir is located in Medina on the south side of the canal. Water discharged from the gates flows eastward through an abandoned water control structure into Oak Orchard Creek and eventually feeds a power generation facility.

The weir extends to the east of the waste gates for 150 feet, and abuts the southern side of the Medina Trough. The weir extends approximately 20 feet above bedrock.

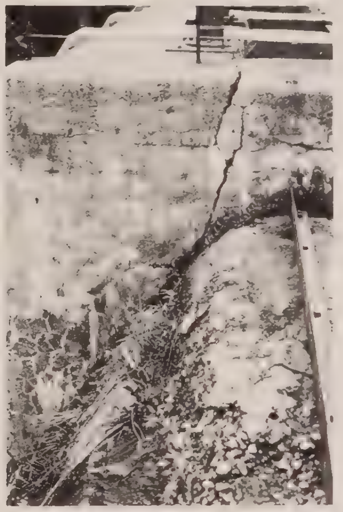
Looking East, Niagara Mohawk Waste Gates at right, Medina Trough (Culvert 99, Medina Aqueduct) in background. Medina Weir

Looking West, Medina Harbor in background. Note vegetation on weir.
Medina Waste Gate and Weir

Canal or North Side
Medina Weir and Waste Gate

The waste gate is 18 1/2 feet high and 45 feet long with six sluice gates. Gate #1 was closed and inoperative, and gates #3, 4, and 5 leaked a considerable amount of water when closed. A horizontal construction joint approximately 9 feet from the bottom had deteriorated to the point where water was leaking through it. Three sections of the membrane wall contained vertical cracks extending from the top down to the construction joint and completely through the wall. All buttresses, except the center one, have cracks from their outside edges extending downward in a diagonal direction to the construction joint of the membrane wall. Vegetation was growing from these joints and cracks.

Cores taken from the membrane walls indicated deterioration from 2 to 6 inches in depth. Two cores taken in the buttresses showed deterioration to 6 inches in depth. In areas where sounding was possible, deterioration was detected on approximately 30% of the membrane wall and buttresses.



Looking West, Cracks in top of waste gate.
Medina Weir and Waste Gate

Leakage Through Closed Gates, Note horizontal joint and vertical cracks.
Medina Waste Gates

Canal Side
Medina Waste Gates
Note kids at left using top of weir as short cut.

Sounding along the bottom of the south side of the weir indicated some delaminated areas and the weir exhibited only minor scaling. The top portion of the weir, mainly the west half, was serviously deteriorated with numerous cracks and chunks of concrete missing. Water was running freely through cracks and the construction joint, and brush was growing along the crest. The north side of the weir exhibited deep deterioration along its top, but the lower section was in good condition.

West End of Weir, Area of Filled Notches
Medina Weir

CONCLUSION

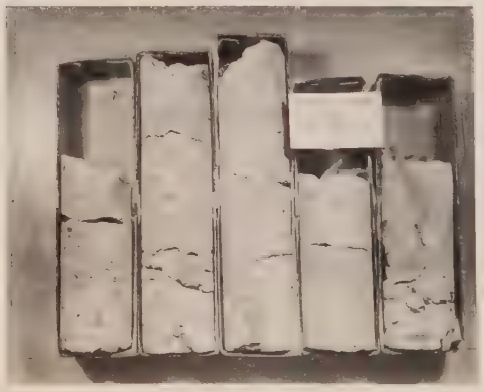
Further deterioration and cracks in the membrane wall and buttresses greatly reduce the factor of safety used in the design of the waste gate. We therefore recommend that all deteriorated concrete be removed to sound material. The entire structure should then be encased in new concrete to prevent seepage of water through the cracks and stop freeze-thaw deterioration of the existing concrete.

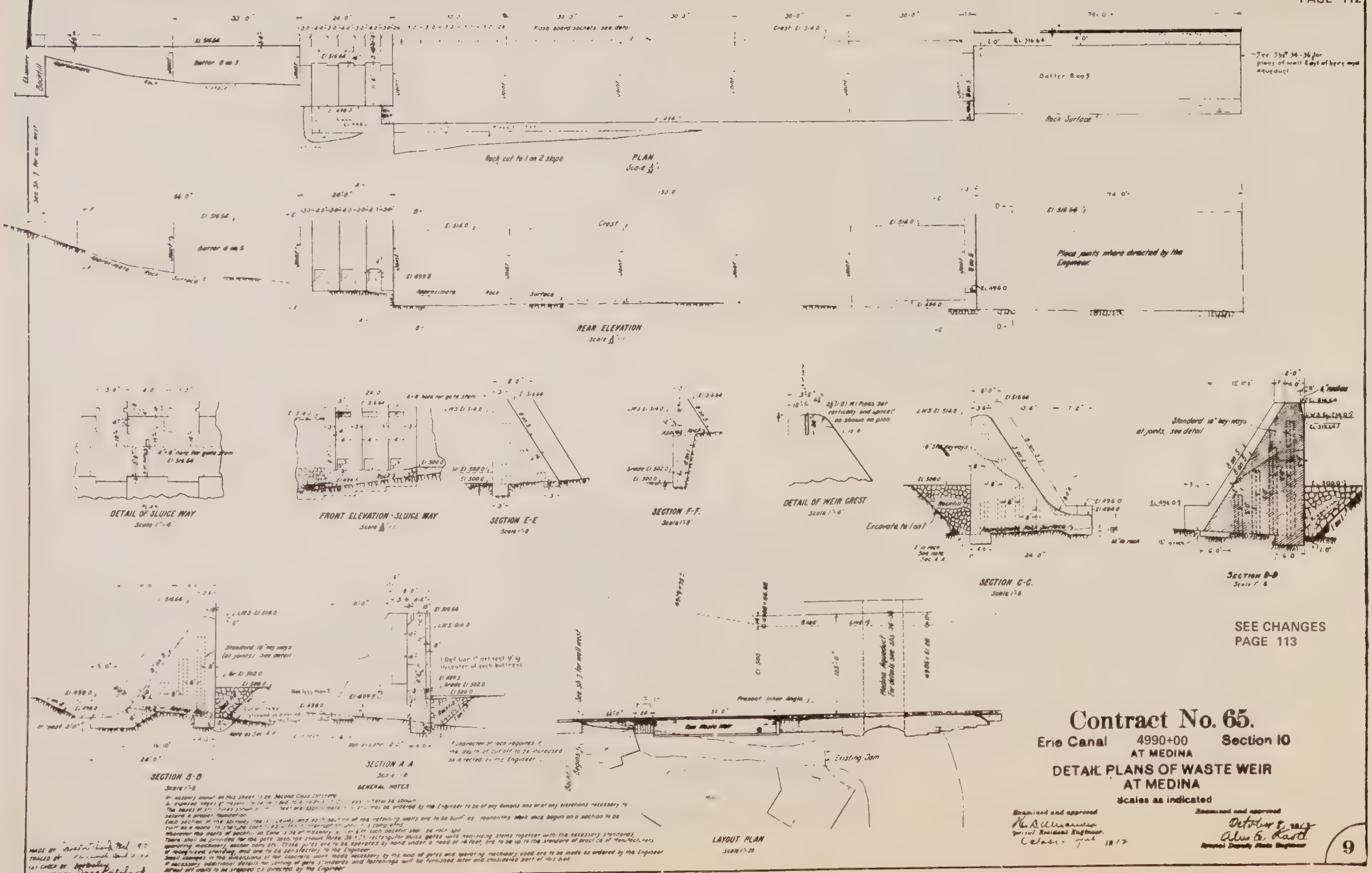
The top of the weir, especially the west half, should be removed and replaced. Any other deteriorated concrete found should be removed until sound concrete is reached. The weir should then be encased in new concrete to prevent further deterioration.

Looking West Along Crest of Weir
Medina Weir

MEDINA WASTE GATE

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	Easternmost Buttress, West Side, 6' From Wall, 4' Above Floor	0	4"	At 6½"	10"	10"	Hollow sounding.
2	Center of Easternmost Panel, South Side, 5' From Top	0	6"	At 11"	16"	16"	Hollow sounding.
3	Center of 2nd Panel From East, South Side, 4' From Top	0	5"	At 9"	17"	17"	Hollow sounding.
4	Center of Westernmost Panel, South Side, 5' From Bottom	0	2"	At 5½"	9"	9"	Solid sounding.
5	2nd Buttress Wall From West, West Side, 4' From Wall, 4' From Bottom	0	6"	*	10"	10"	* Cored through horizontal crack into piece of wood.





SEE CHANGES
PAGE 113

Contract No. 65.

Erie Canal 4990+00 Section 10

AT MEDINA

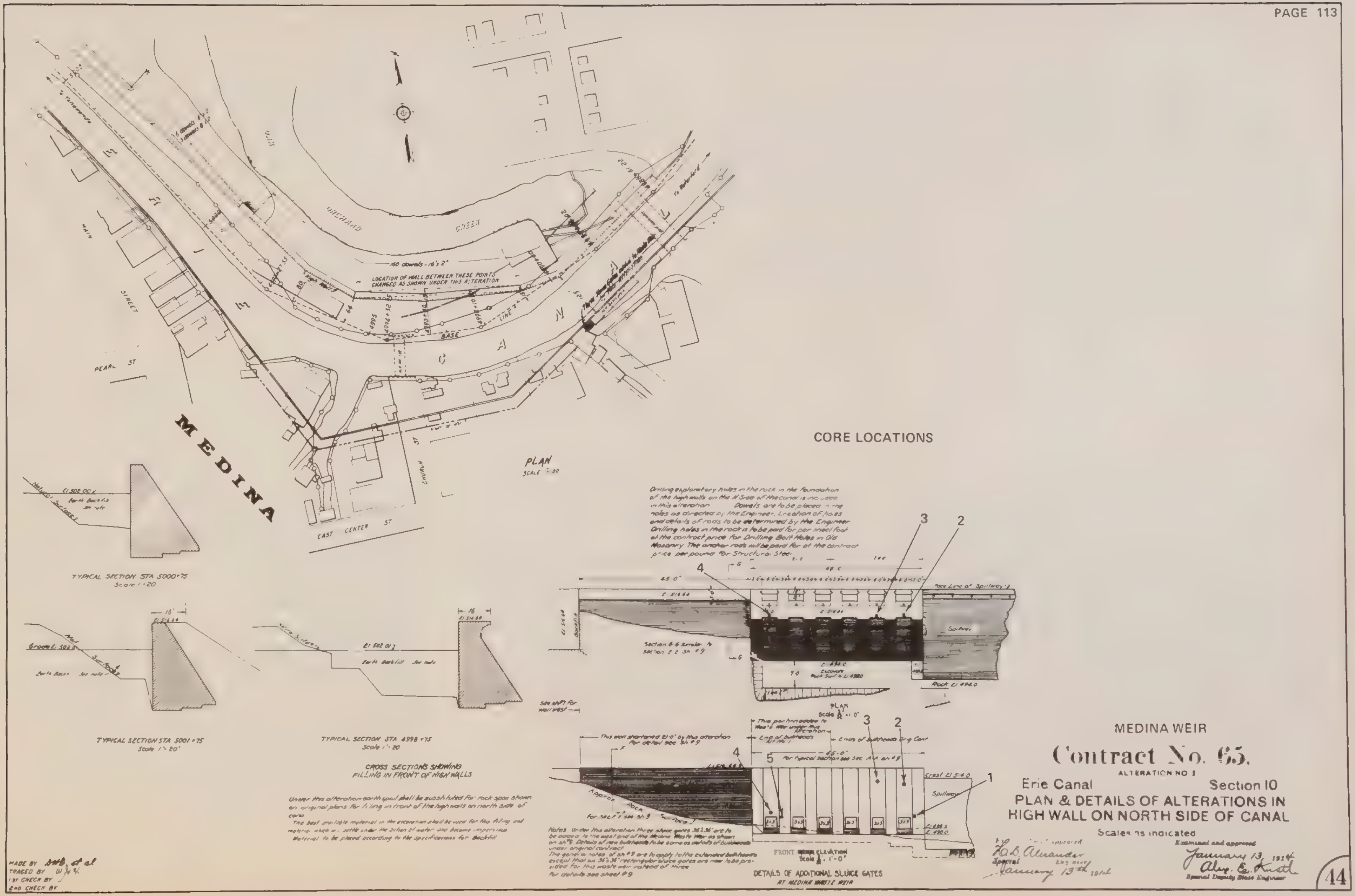
DETAIL PLANS OF WASTE WEIR AT MEDINA

Scales as indicated

Examined and approved
Special Resident Engineer.
October 7th 1917

Examined and approved
October 8, 1917
Special Deputy State Engineer

9



MEDINA
ERIE CANAL
ORCHARD CREEK
MAIN STREET
PEARL ST
CHURCH ST
EAST CENTER ST
To Tonawanda
To Rochester
160 dowels - 16'± 2"
LOCATION OF WALL BETWEEN THESE POINTS CHANGED AS SHOWN UNDER THIS ALTERATION
BASE LINE
PLAN
CORE LOCATIONS
TYPICAL SECTION STA 5000+75
Scale 1"=20
TYPICAL SECTION STA 5001+75
Scale 1"=20'
TYPICAL SECTION STA 4998+75
Scale 1"=20
CROSS SECTIONS SHOWING
FILLING IN FRONT OF HIGH WALLS
Under this alteration earth spoil shall be substituted for rock spoil shown on original plans for filling in front of the high walls on north side of canal
The best available material in the excavation shall be used for this filling and material which will settle under the action of water and become impervious
Material to be placed according to the specifications for Backfill
Drilling exploratory holes in the rock in the foundation of the high walls on the N Side of the canal is included in this alteration. Dowels are to be placed in the holes as directed by the Engineer. Location of holes and details of rods to be determined by the Engineer. Drilling holes in the rock is to be paid for per lineal foot at the contract price for Drilling Bolt Holes in Old Masonry. The anchor rods will be paid for at the contract price per pound for Structural Steel
Section 6-6 Similar to Section E-E Sh #9
Rock El 494.0
PLAN
Crest El 516.0
Spillway
Approx. Rock Surface
For sec F-F see sh 9
Notes Under this alteration three sluice gates 36"x36" are to be added to the west end of the Medina Waste Weir as shown on sh #9. Details of new bulkheads to be same as details of bulkheads under original contract.
The general notes of sh #9 are to apply to the extended bulkheads except that six 36"x36" rectangular sluice gates are now to be provided for this waste weir instead of three
For details see sheet #9
FRONT ELEVATION
Scale 1/8"=1'-0"
DETAILS OF ADDITIONAL SLUICE GATES
AT MEDINA WASTE WEIR
1
2
3
4
5
MEDINA WEIR
Contract No. 65.
ALTERATION NO 1
Erie Canal
Section 10
PLAN & DETAILS OF ALTERATIONS IN
HIGH WALL ON NORTH SIDE OF CANAL
Scales as indicated
Examined and approved
January 13 1914
Special Deputy State Engineer
MADE BY
TRACED BY
1ST CHECK BY
2ND CHECK BY
44

MIDDLEPORT WEIR AND WASTE GATE

This structure is located in Middleport on the south side of the canal. It is composed of a 60 foot long stone masonry weir on the east end, a 9 foot wide concrete waste gate in the middle and a 30 foot long, 22 foot high stone masonry wall over Culvert 107 on the west end. The stone masonry dates to the 1862 Erie Canal enlargement or earlier.

Water exiting from the two waste gate openings flows immediately around a corner and drops 5 feet into a culvert well. From there it passes through the twin barrels of Culvert 107.

Around 1910, the concrete waste gate was constructed and a 1 foot thick concrete wall was placed behind the masonry weir. Some time ago, Canal Maintenance Personnel covered the canal side of this structure with a 1/2 inch thickness of shotcrete and repaired the top of the waste gate. A pedestrian bridge over the weir was recently constructed.

No shotcrete was placed on the concrete waste gate. Many cracks and some efflorescence were visible on this wall surface and approximately 60% of it sounded delaminated. Core #3, taken near the center of the wall, revealed rubble to a depth of 2 inches and cracking to a depth of 10 inches. Cores #1 and 2 were taken from the back or canal side of the 3 foot thick membrane wall and indicated deterioration to 6 and 8 inches, respectively.

Looking East, Culvert 107 Entrance under wall in foreground, Waste Gate and Weir in background, Note new pedestrian bridge over weir.

Canal Side, Looking East, Note concrete wall behind weir and shotcrete repairs. Middleport Weir

Looking East, Stone Masonry Weir, 1-Foot Thick Concrete Wall on Canal Side of Weir. Middleport Weir

The main problem with the waste gate was the concrete lining the sides of the two openings. It was fractured and chunks had washed away. This could cause support problems for the metal channels holding the sliding doors in place. As it was, the gate control mechanisms worked very hard and the gates could not be closed at the time.

The stone masonry weir was in good condition and had little seepage through it. Leakage through the high wall over the Culvert 107 entrance, however, was excessive. Measures to stop this flow and repair the Culvert 107 entrance are to be started early in 1977.

CONCLUSION

Repair of the waste gate should include patching or replacing the concrete lining in the openings which supports the doors. Region Canal Maintenance Personnel have scheduled this work to begin early in 1977 in connection with Culvert 107 repairs. These repairs should include the removal of all deteriorated concrete, or the complete replacement of this small concrete wall. We do not anticipate any other repairs at this time.

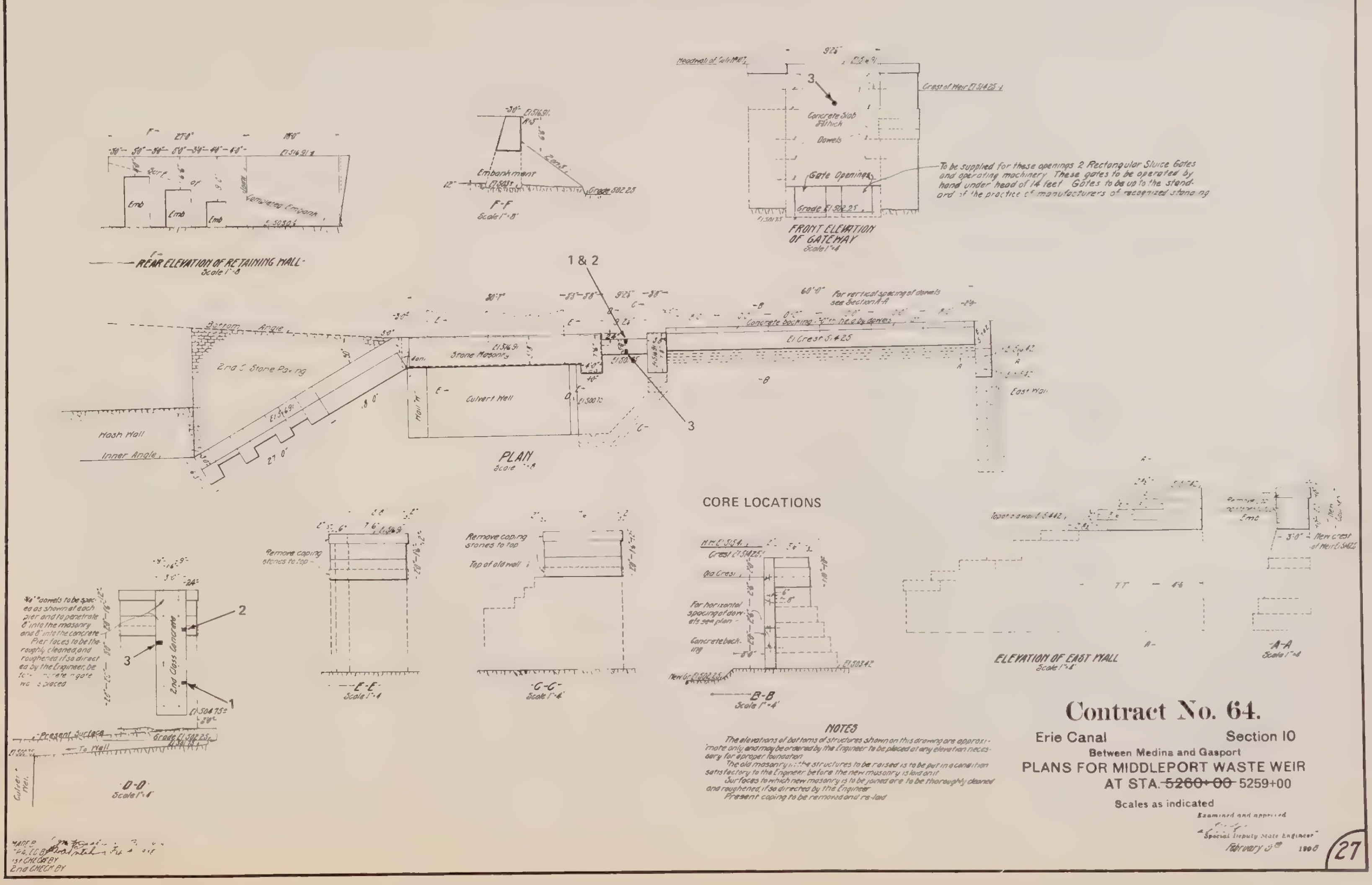
Canal or North Side, Note core holes #1 (bottom) and #2 (top).
Middleport Waste Gate

South Side, Note repairs to top of waste gate behind branches. Middleport Waste Gate

Stone Masonry Wall Over Culvert 107 Entrance, Creek Cascades Over Dam in Foreground, Note leakage from arch stones.

MIDDLEPORT WASTE GATE

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	Middle of Waste Gate, North (Canal) Side, 6' From Bottom	0	6"	0	11½"	11½"	Sounded solid.
2	Middle of Waste Gate, North (Canal) Side, 11' From Bottom	0	8"	0	12½"	12½"	Sounded hollow.
3	Middle of Waste Gate, South Side, 5' From Top	0	10"	0	15"	15"	Sounded hollow.


REAR ELEVATION OF RETAINING WALL
Scale 1"=8'
Completed Embank
Emb
F-F
Scale 1"=8'
Embankment
Grade 502.25
FRONT ELEVATION OF GATEWAY
Scale 1"=4'
Headwall of Culvert
Crest of Weir El 514.25
Concrete Slab
Dowels
Gate Openings
To be supplied for these openings 2 Rectangular Sluice Gates and operating machinery. These gates to be operated by hand under head of 14 feet. Gates to be up to the standard of the practice of manufacturers of recognized standing
1 & 2
3
For vertical spacing of dowels see Section A-A
Concrete backing
El Crest 514.25
Bottom Angle
2nd C Stone Paving
Stone Masonry
Culvert Wall
Wash Wall
Inner Angle
East Wall
PLAN
Scale 1"=8'
CORE LOCATIONS
2
1
3
Present Surface
Grade El 502.25
To Well
D-D
Scale 1"=4'
2nd Class Concrete
E-E
Scale 1"=4'
Remove coping stones to top
Top of old wall
C-C
Scale 1"=4'
Old Crest
For horizontal spacing of dowels see plan
Concrete backing
B-B
Scale 1"=4'
ELEVATION OF EAST WALL
Scale 1"=4'
A-A
Scale 1"=4'
NOTES
The elevations of bottoms of structures shown on this drawing are approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.
The old masonry in the structures to be raised is to be put in a condition satisfactory to the Engineer before the new masonry is laid on it.
Surfaces to which new masonry is to be joined are to be thoroughly cleaned and roughened, if so directed by the Engineer.
Present coping to be removed and re-laid
Contract No. 64.
Erie Canal
Section 10
Between Medina and Gasport
PLANS FOR MIDDLEPORT WASTE WEIR
AT STA. 5260+00 5259+00
Scales as indicated
Examined and approved
Special Deputy State Engineer
February 5th 1908
27

WATSONS WEIR AND WASTE GATE

The Watson Waste Gate and Weir is located 2 miles west of Middleport on the south side of the canal. The waste gate has two openings and is supported by two buttresses. The weir is located to the west of the waste gate. A construction joint runs horizontally across the entire length of the structure 8 feet above bedrock.

The top section of the waste gate, above the construction joint, was sounded and few delaminations were detected. This section also exhibited little or no cracking and scaling. The bottom portion of the gate sounded delaminated and exhibited cracks and scaling over approximately 25% of its area. Deterioration and leakage existed along the construction joint. Core #1 was taken from the front of the membrane wall below the construction joint. Slight cracking was observed to a depth of only 1 1/2 inches. This core had a compressive strength of 5815 p.s.i.

The buttresses were in much the same condition as the membrane wall. The upper parts of the buttresses were in good condition and the lower sections below the construction joint showed cracking and delaminations. Leakage of water through the construction joint has caused the bottom section of this structure to deteriorate much more rapidly than the top section. Little difference in concrete quality was evident between the top and bottom sections on the canal side of the structure.

Much leakage through the construction joint was also occurring along the weir, especially at the east end. Delaminations were detected on approximately 30% of the top 3 1/2 feet of the weir. Scaling up to 1 1/2 inches in

Looking East, East Abutment
Watsons Weir and Waste Gate

South Side, Note core hole #1
and horizontal joint.
Wastsons Waste Gate

North Side, Note horizontal joint.
Watsons Waste Gate

depth was also present. The bottom section of the weir also exhibited scaling over most of its surface. As with the waste gate, this form of deterioration was attributed to leakage of water through the construction joint. Soundings revealed delaminated areas covering 20% of its surface. Core #2, taken from the front of the weir in a scaled area below the construction joint, indicated deterioration 5 inches deeper than the 4 inch deep scaling present on the surface. Much of the area behind the weir has been backfilled.

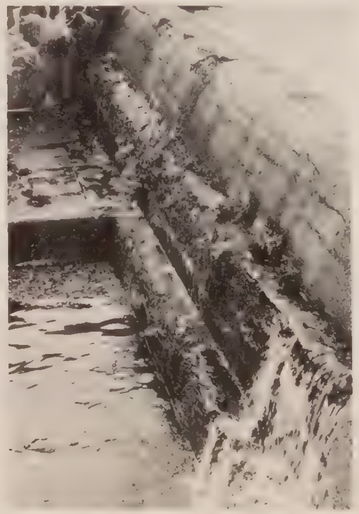
The construction joint also extended through the east abutment. The upper section of the wall was in generally good condition with light cracks at the top while the lower section exhibited delaminations on approximately 30% of its surface. The abutment wingwall was in generally good condition with light cracks at the top and bottom, but water was running freely from behind the wingwall. Sheetpiling has been driven behind the abutment in an attempt to cut off this water.

Looking West, West Abutment
Watsons Weir and Waste Gate

The west abutment exhibits light cracking and efflorescence over half of its surface, but sounding revealed little delamination.

CONCLUSION

Although heavy leakage was occurring through the construction joint, this structure was basically sound. The construction joint through the waste gate and weir should be sealed to prevent further deterioration. The top section and other areas of the weir containing deterioration should be removed and a new top and front face of the weir bonded to the existing sound concrete. Other deteriorated areas of the abutments and waste gate should also be repaired and leakage from behind the east abutment should be cut off.

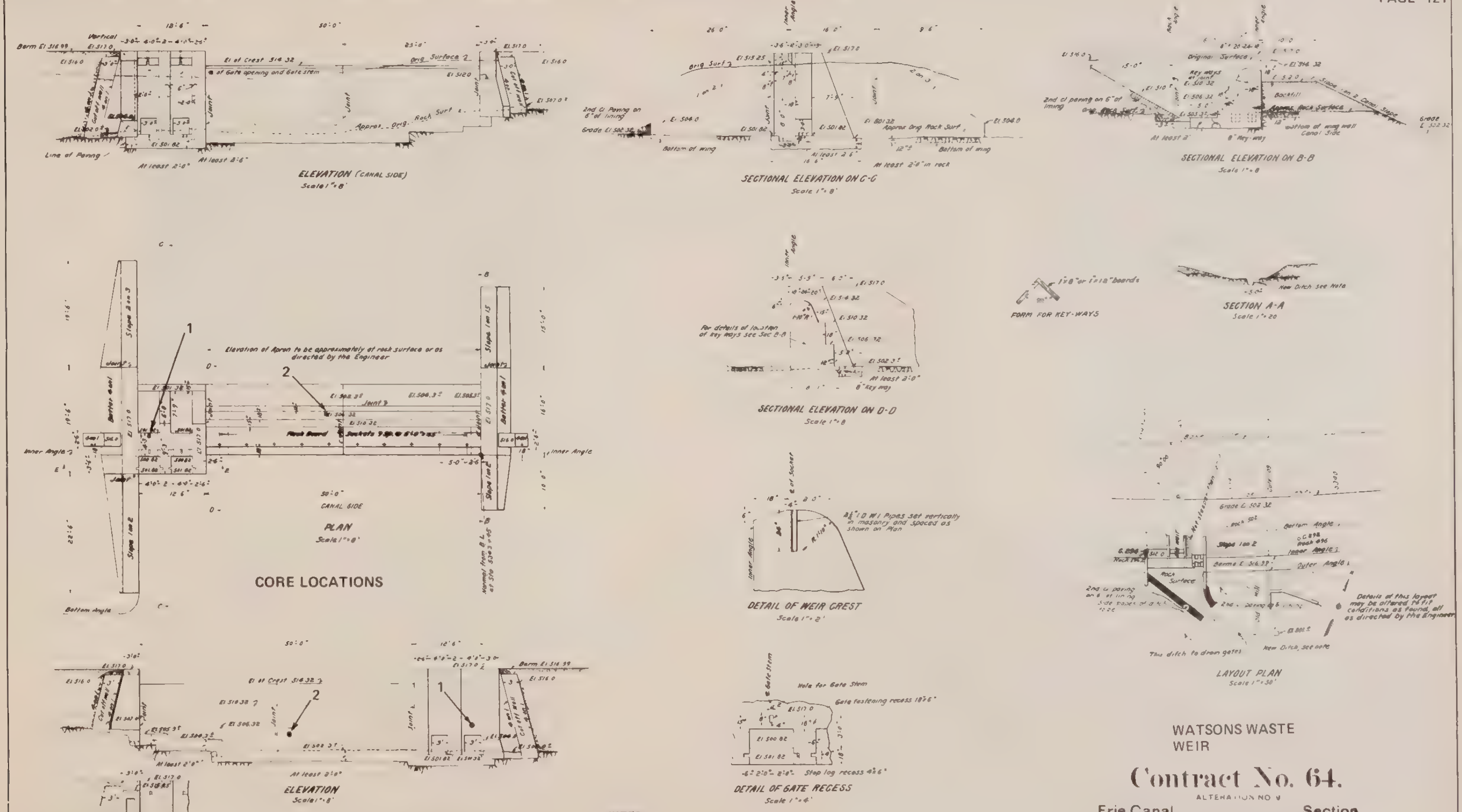


South Side
Watsons Weir

Leak From Behind East Abutment
Watsons Waste Gate

WATSONS WASTE GATE AND WEIR

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	Waste Gate, South Side, Center of East Panel, 4½' From Bottom	0	1½"	0	12"	12"	Solid sounding area.
2	Center of Weir, South Side, 3½' From Bottom	4"	9"	0	13"	17"	



NOTES

The bases of Structures shown on this Plan are to be considered as approximate only, and may be ordered by the Engineer to be at any elevations or of any dimensions to give a proper foundation.

All masonry shown on this sheet to be 2nd Cl. Concrete.

Sections between joints to be built as monoliths. Work once begun on a section to be built as a monolith shall be continued without interruption until the section is completed.

Round all exposed edges of concrete to a 3" radius unless otherwise shown. Edges of joints to be rounded to a ½" radius.

The foundation is to be stepped into the rock approximately as shown on this Plan. In case rock does not occur at elevations shown on the Plan, the foundation is to be stepped as the Engineer may direct.

Edges of 2nd Cl Paving to be protected by a course of stone at least 18" deep. Payment therefor to be made as 2nd cl. stone paving. Where the toe of a paved slope rests on rock, the rock is to be recessed to form a footing for the paving.

Limits of 2nd cl paving are approximate only. Exact limits to be determined by the Engineer.

Exact locations and grades of ditch to be determined by the Engineer.

There are to be provided for the Gate openings, shown on the plans, two 36" x 36" rectangular sluice gates with non-rising stems together with the necessary standards operating machinery, anchor bolts etc. These gates are to be operated by hand under a head of 15' and are to be up to the standard of Practice of manufacturers of recognized standing. Any small changes in the masonry made necessary by the type of gate used are to be made by order of the Engineer without extra expense to the State.

Made By ... 1911
Traced By T.S. ... 1911
1st Check By ...
2nd Check By

WATSONS WASTE
WEIR

Contract No. 64.

ALTERATION NO. 9

Erie Canal — Section

DETAIL PLANS FOR WASTE WEIR ON SOUTH SIDE OF CANAL AT JOHNSONS CREEK STA ~~5343+45~~ 5342+10

Scales as indicated

Examined and approved
March 28, 1911
Alex. E. Kastl
Special Deputy State Engineer

75

This structure is located ½ mile east of Gasport on the north side of the canal and is also referred to as Maybee's Weir.

In 1973, the waste gate and weir were rehabilitated under Contract M73-6. Both sides of the two weirs were refaced, the waste gate was encased in new concrete, the east abutment was rebuilt and the two center piers supporting the tow path bridge were recapped.

Some deterioration in the form of cracking and delaminations (30% of surface) existed in the lower sections of the piers. Most other areas were still in good condition with few cracks and scaled areas.

North Side
Gasport Weir and Waste Gate

East Half of Weir
Gasport Weir and Waste Gate

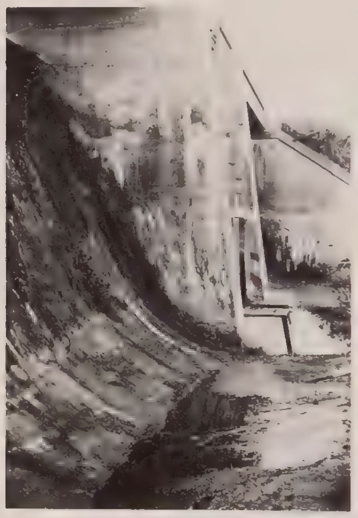
North Side
Gasport Waste Gate

A new steel grate, tow path bridge has been erected over the structure and new gate valve operating mechanisms have been installed.

One core was obtained from the north face of the east weir section. This core had a compressive strength of 4485 p.s.i.

Conclusion

This structure is in very good condition and no repairs are presently recommended. We believe that this structure serves as a good example for future restoration of similar water control structures along the canal.



Looking West, Note repaired west abutment and piers. Gasport Weir and Waste Gate

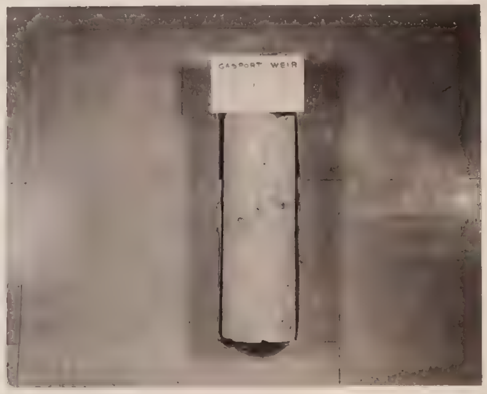
Looking East, Note repaired east abutment and piers. Gasport Weir and Waste Gate

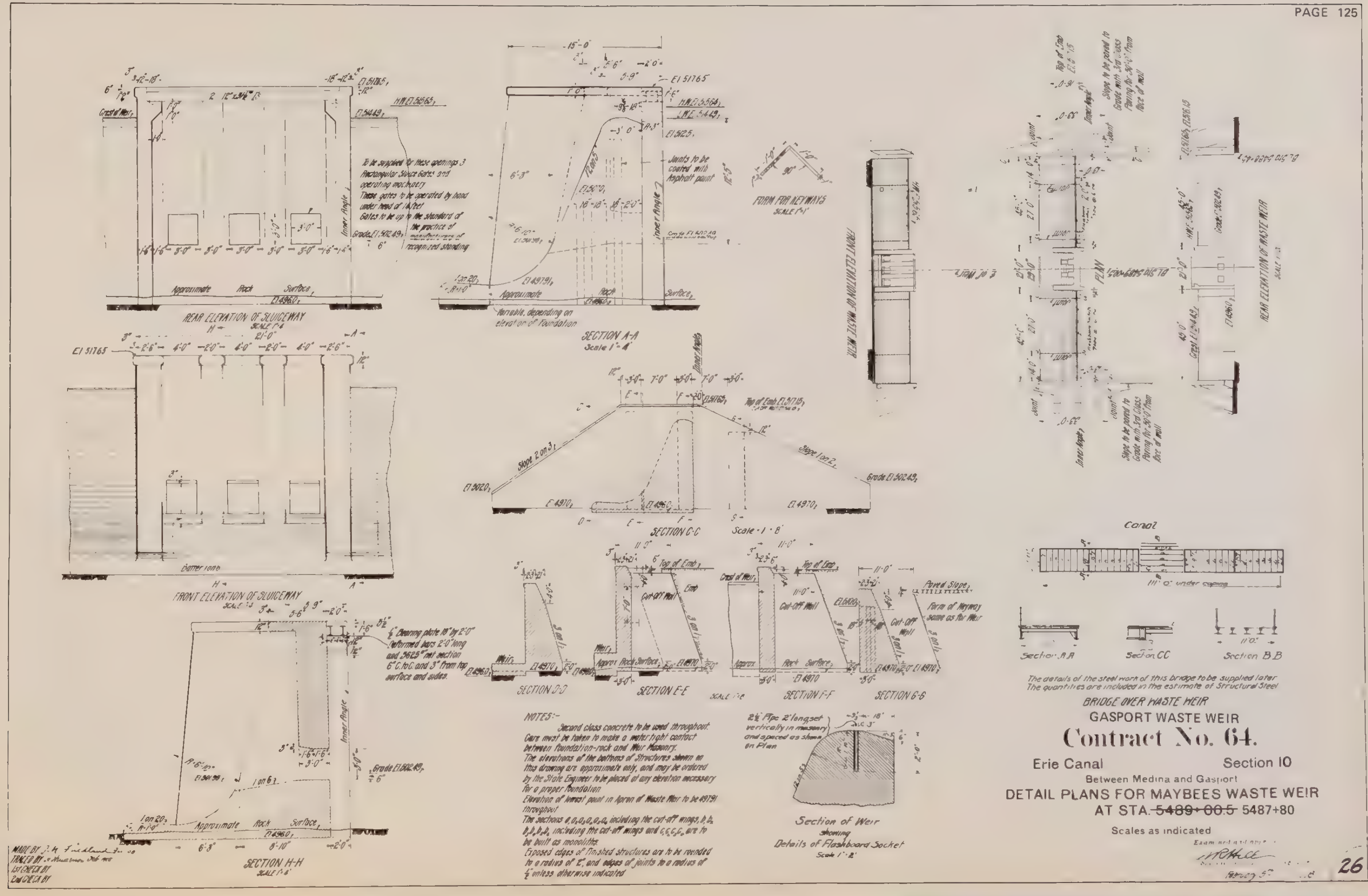
Looking West, Note new facing on both sides of weir. Gasport Weir

Canal or South Side
Gasport Weir and Waste Gate

GASPORT WEIR

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	North Side, East Weir, 15' From East Pier, 3' From Bottom	0	0	0	12"	12"	Recently rebuilt.




REAR ELEVATION OF SLUICEWAY
To be supplied for these openings 3 Rectangular Sluice Gates and operating machinery
These gates to be operated by hand under head of 14 feet
Gates to be up to the standard of the practice of manufacturers of recognized standing
Approximate Rock Surface
SECTION A-A
Scale 1" = 4'
Joints to be coated with Asphalt paint
Variable, depending on elevation of foundation
FORM FOR KEYWAYS
FRONT ELEVATION OF WASTE WEIR
PLAN
REAR ELEVATION OF WASTE WEIR
Slope to be paved to Grade with 3rd Class Paving for 50'-0" from face of wall
Inner Angle
FRONT ELEVATION OF SLUICEWAY
Batter 1 on 6
Slope 2 on 3
Slope 1 on 2
Top of Emb. El. 517.15
SECTION C-C
Scale 1" = 8'
½" Bearing plate 18" by 2'-0"
Deformed bars 2'-0" long and .5625" net section 6" C. to C. and 3" from top surface and sides.
SECTION H-H
SECTION D-D
SECTION E-E
SECTION F-F
SECTION G-G
Cut-Off Wall
Paved Slope
Form of Keyway same as for Weir
NOTES:-
Second class concrete to be used throughout.
Care must be taken to make a water tight contact between foundation-rock and Weir Masonry.
The elevations of the bottoms of structures shown on this drawing are approximate only, and may be ordered by the State Engineer to be placed at any elevation necessary for a proper foundation.
Elevation of lowest point in Apron of Waste Weir to be 497.91 throughout.
The sections d,d,d,d,d,d, including the cut-off wings, b,b,b,b,b,b, including the cut-off wings and c,c,c,c, are to be built as monoliths.
Exposed edges of finished structures are to be rounded to a radius of 1", and edges of joints to a radius of ½" unless otherwise indicated.
2½" Pipe 2' long set vertically in masonry and spaced as shown on Plan
Section of Weir showing Details of Flashboard Socket
Scale 1" = 2'
Canal
111' 0" under coping
Section A.A
Section CC
Section B.B
The details of the steel work of this bridge to be supplied later
The quantities are included in the estimate of Structural Steel
BRIDGE OVER WASTE WEIR
GASPORT WASTE WEIR
Contract No. 64.
Erie Canal
Section 10
Between Medina and Gasport
DETAIL PLANS FOR MAYBEES WASTE WEIR
AT STA. ~~5489+00.5~~ 5487+80
Scales as indicated
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
26

LOCKPORT WEIR AND WASTE GATE

The Lockport Waste Gate and Weir is located in the City of Lockport just west of Exchange Street on the south side of the canal. This structure is composed of a waste gate with three openings, and two sections of weir west of the gate. The weir adjacent to the waste gate was built by encasing in concrete an old stone masonry weir which was part of the Erie Canal. The weir to the west of the concrete and masonry weir is composed of concrete throughout. Another stone masonry weir once extended to the east of the waste gate. Its only present purpose is to serve as part of the retaining wall along the south side of the canal.

The waste gate contains three membrane walls constructed between old stone masonry buttresses. These buttresses have been encased in 10 inches of concrete.

The center membrane wall had cracks and efflorescence covering approximately 20% of its front surface. Sounding of the concrete revealed few delaminations. The western membrane wall appeared to have serious deterioration in the form of cracks and delaminations covering most of its front surface. The eastern membrane wall exhibited cracks and efflorescence covering approximately 20% of its surface. Little delamination of the surface was detected by sounding.

Core #1, taken from the center membrane wall, revealed no deterioration and had a compressive strength of 6250 p.s.i. Core #3, taken from the western membrane wall, showed deterioration to a depth of 13 inches and had a compressive strength of 3930 p.s.i. in its lower section. Core #4, taken from the back of the western membrane wall, revealed deterioration to a 3 inch depth.

Looking West,, Note new repairs on west half of weir. Lockport Weir

South Side, Concrete Encased Stone Masonry Walls. Lockport Waste Gate

Looking East, 1975
Lockport Weir and Waste Gate

The concrete encasement of the stone buttresses was distressed. The west buttress had approximately 8 inch deep deterioration. 4 to 5 feet above the foundation and much leakage was apparent through the encasement. The center and east buttresses had cracks and efflorescence over 50% of their surfaces. The center buttress encasement has split away from the membrane wall and a large quantity of water was leaking through this crack. Core #2, taken from the center buttress and through the concrete encasement, revealed deterioration of the concrete to a depth of 6 inches. Water ran freely from the core hole after the core was removed. The sluice gates either could not be completely closed or were inoperative.

The east half of the weir was in very good condition. The surface of the concrete is lightly scaled, but no delaminations were detected by sounding.

During the Winter and Spring of 1976, a 40 foot long deteriorated section was removed from the crest of the west half of the weir. Sound concrete was encountered at a keyed construction joint approximately 2 feet below the crest and a new concrete crest was bonded to the existing concrete. However, isolated areas of deteriorated concrete still exist on the weir face below the repair. Core #1, taken from the front of the weir in a delaminated area, revealed deterioration to a depth of 6 inches.

Canal or North Side, Note stone masonry wall over Culvert 125 at left.
Lockport Weir

Canal or North Side, Looking Southwest
Lockport Waste Gate and Weir

Looking East, 1976 Repairs to Weir, Note shape of notch on top of weir.
Lockport Weir

The old stone masonry weir east of the waste gate was capped with a concrete wall when the Barge canal was built. This weir consists of a back wall which lines up with the canal retaining wall and a front wall directly over the Culvert 125 entrance. In between is a 10 foot wide area of earth fill capped with stone blocks.

Recently Canal Maintenance Personnel have replaced the concrete cap of the east stone weir in an attempt to stop a large quantity of water which cascades out from the front side of the stone blocks and down into the entrance of Culvert 125. Also, a clay cutoff wall was placed behind the concrete faced, stone block masonry retaining wall extending east toward Exchange Street and the wall surfaces were patched. However, the leak continued when the canal was refilled.

CONCLUSION

The concrete encasing the waste gate buttresses was deteriorated in many areas. Deep deterioration existed in the west membrane wall and the others also have areas of deterioration.

Future restoration of the waste gate should include removal of the concrete encasing the buttresses and removal of all deteriorated concrete in the membrane wall. Then the entire waste gate should be encased in concrete.

Both of the weirs west of the waste gate were in good condition. No repairs to either structure are presently anticipated.

The heavy leak existing over the top of Culvert 125 should be located and sealed.

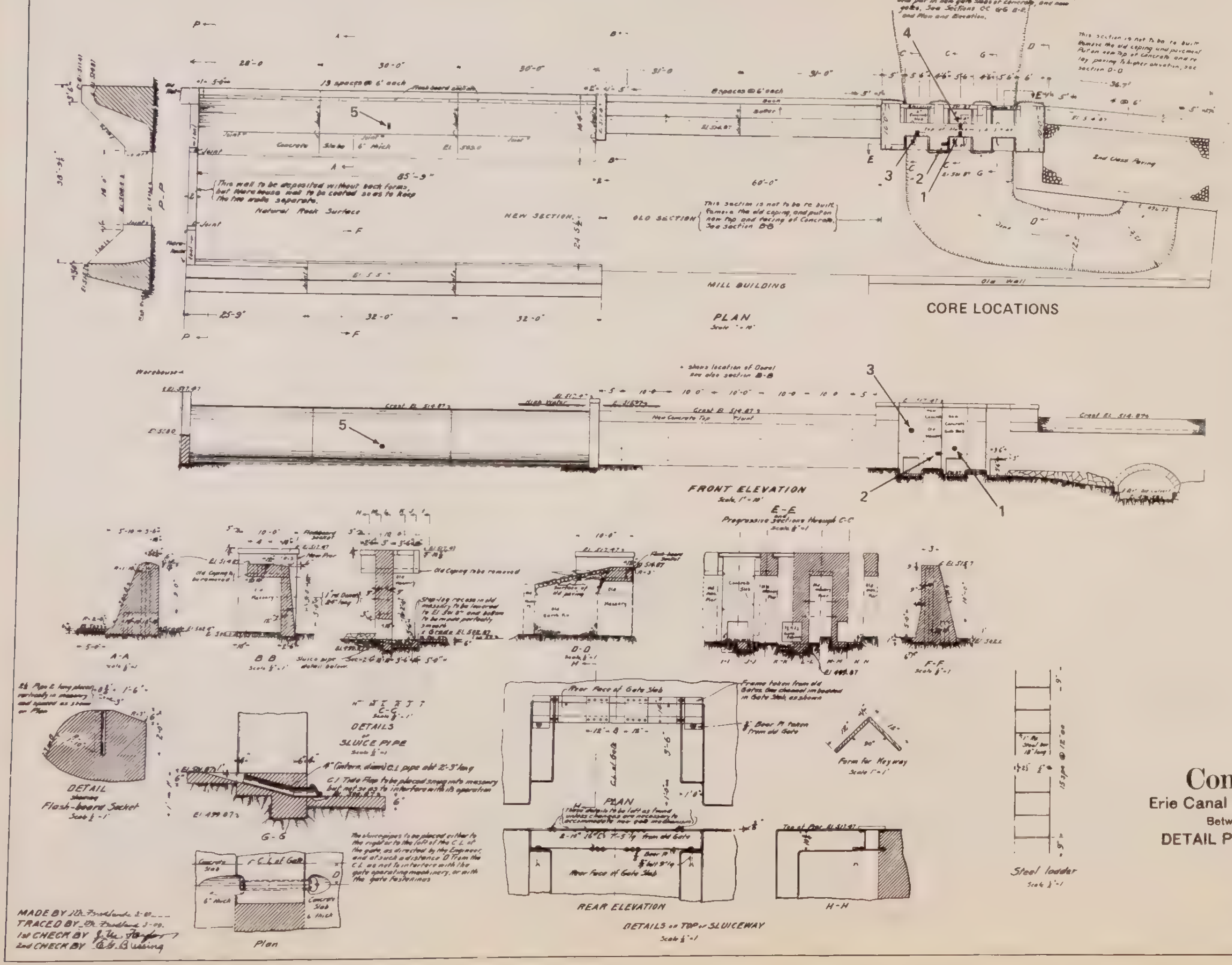
Leak Over the Top of Culvert 125
Lockport Weir

Looking East, 1976. Note removal of shed over gates, removal of garage on right, and leak over Culvert 125 entrance.

Culvert 125 Entrance at Lower Left, 18 Mile Creek Culvert Exit in Center. (Note missing lower left corner of arch.) Lockport Waste Gate

LOCKPORT WASTE GATE AND WEIR

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	Waste Gate, South Side, Center of Middle Panel, 5½' Above Floor	0	0	0	12"	12"	Sounded solid, east panel same condition.
2	Waste Gate, Center Buttress, East Side, 4½' Above Floor	0	6"	0	10½"	10½"	Sounded hollow, cored into limestone blocks.
3	Waste Gate, South Side, Center of West Panel, 5' From Top	0	13"	0	23"	23"	Very hollow sounding.
4	Waste Gate, North (Canal) Side, Center of West Panel, 5' From Top	0	3"	At 7"	13"	13"	Sounds solid.
5	Weir, South Side, Center of West Half, 3' From Bottom	0	6"	At 6½"	9½"	9½"	Sounded hollow.



Notes

1 All concrete for the structures shown on this sheet is to be 2nd Class Concrete
2 Before depositing concrete upon old masonry or upon rock, and before joining concrete masonry with stone masonry, the surface of the old masonry, or of the rock is to be thoroughly cleaned, and roughened, if directed by the Engineer, to secure a good bond.
3 Elevations of the bottoms of the structures shown on this sheet are approximate only, and they are to be placed at any elevation necessary for a proper foundation
4. Exposed edges of completed structures are to be rounded to a radius of 2", except where otherwise shown. Edges of joints to be rounded to a radius of 1"
5. There are to be supplied.
a. Three rectangular sluice gates, and operating machinery, for the gate openings shown on this sheet. The gates are to be operated by hand under a head of 14 ft. and are to be up to the standard of manufacturers of recognized standing
b. Three ¾" chains each 20' long, one end to be attached to the ring in the tide-flap cover, the other to be fastened to a hook at the top of the pier, as directed by the Engineer.
c. One steel ladder 16'-6" long, as shown.
6 Each section of the new spillway and of the additions to the old spillways, shall be constructed as a monolith. The top of the sluiceway, together with the gate slabs between the piers, shall also be constructed as a monolith. Work once begun upon a section built as a monolith shall be continued without interruption until the section is completed

SEE CHANGES
PAGE 131

Contract No. 66.

Erie Canal Section X.

Between Gasport and Lockport

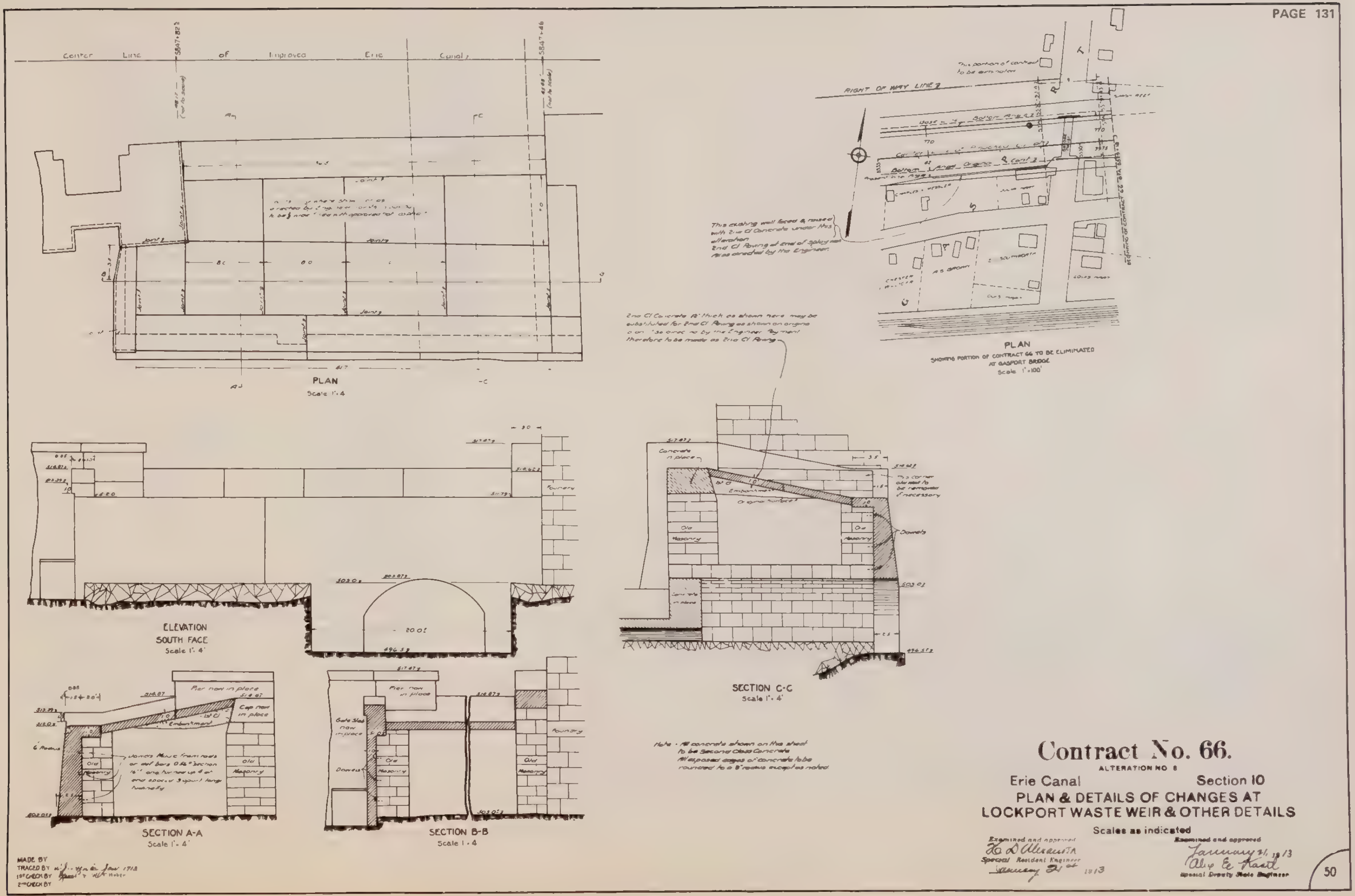
DETAIL PLANS FOR WASTE WEIR
AT LOCKPORT
STA. 5849+00

Scales as indicated

Examined and approved

Special Deputy State Engineer.

190 8



Center Line of Improved Erie Canal
PLAN
Scale 1"=4'
ELEVATION
SOUTH FACE
Scale 1"=4'
SECTION A-A
Scale 1"=4'
SECTION B-B
Scale 1"=4'
SECTION C-C
Scale 1"=4'
RIGHT OF WAY LINE
PLAN
SHOWING PORTION OF CONTRACT 66 TO BE ELIMINATED AT GASPORT BRIDGE
Scale 1"=100'
Note - All concrete shown on this sheet to be Second Class Concrete. All exposed edges of concrete to be rounded to a 3" radius except as noted.
Contract No. 66.
ALTERATION NO. 8
Erie Canal
Section 10
PLAN & DETAILS OF CHANGES AT
LOCKPORT WASTE WEIR & OTHER DETAILS
Scales as indicated
Examined and approved
Special Resident Engineer
Examined and approved
Special Deputy State Engineer
MADE BY
TRACED BY
1ST CHECK BY
2ND CHECK BY

The original 1825 Erie Canal circled south around the gorge at Holley. The enlarged Erie Canal (1862) was constructed across the gorge on a high embankment and only the west branch of the canal leading to the Town of Holley was retained. Also, a stone masonry waste weir was constructed at the east end of the canal embankment.

Later, the Buffalo, Lockport and Rochester Electric Railway was constructed across the gorge on the south side of the canal embankment. This was accomplished by extending the south end of the Sandy Creek Culvert (Culvert #65) over 60 feet and widening the canal embankment.

On the west side of the gorge, the railway bridged over the west branch of the old Erie Canal branch into Holley. On the east side of the gorge, a large, concrete arch culvert, which still exists, was constructed under the railway to pass weir water down into the gorge. A short distance downstream of the culvert is a 50 foot waterfall. In 1976, a local organization appeared to be clearing the base of the canal embankment and turning the waterfall area into a small park.

In 1911, the Barge Canal was constructed in the same location as the enlarged Erie. A new waste weir was built at the east end of the south trough wall where the old weir existed. At the west end of the south trough wall, the Holley Spillway was built to also drain off excess canal water and feed it into the now abandoned Erie Canal branch into Holley. This spillway was recessed 16 feet further back than the south trough wall. Abandonment of the electric railway wás proceeding at this time, so it did not conflict with Barge Canal construction.

Old Railway Culvert Next to Holley Weir

Holley Waterfall Downstream From Holley Weir

HOLLEY TROUGH

At Holley, the Barge Canal crosses a gorge created by the East Branch of Sandy Creek (Culvert #65) on a 83 foot high embankment. The 96 foot wide by 2040 foot long trough on this embankment was constructed under Contract 62 between 1911 and 1913.

Originally, the trough floor was designed as a double layer waterproofed slab, but this design was modified by Alteration #1 (Nov. 1911) as a result of the problems encountered at Bushnell Basin. Also, this alteration nearly doubled the original 1100 foot length of the trough.

On March 30, 1976, the trough was inspected and 4 cores were retrieved from the south wall. The center of the trough floor was covered with 6 inches of water and the sides were covered with mud up to 1 foot deep which prevented its complete inspection.

The north trough wall is composed of 40 panels plus the two end splaywalls. From east to west, the first 21 panels were in good condition with no detectable delaminations. On the 22nd panel, the east half was in good condition whereas the west half was 75% delaminated and contained a 3 inch wide by 6 inch deep by 7 foot long area of concrete scaling near the bottom of the wall. Between the 23rd and 40th panels, six panels contained no detectable delaminations, one panel was 50% delaminated, eleven contained between 5-20% of their surface area deteriorated and the west splaywall was 80% delaminated. Six additional areas of deep concrete scaling were seen on three panels. These scaled areas most likely have resulted from pockets of honeycombed (lack of consolidation) concrete.

Looking West from East End
Holley Trough

North Wall, Looking West from near East End
Holley Trough

Looking West, West End of North Wall
Holley Trough

The south wall is over 500 feet shorter than the north wall. At the west end of the south wall is the Holley Spillway and at the east end is the Holley Weir. East of the weir, the south side of the trough has a concrete slab lining the inside slope.

In 1919, under Contract 200, the top of the Holley Spillway was raised 3 feet with concrete to eliminate any water from flowing into the abandoned Erie Canal channel. This top 3 feet is now 100% delaminated while the spillway wall underneath is still in relatively good condition.

Perpendicular to the spillway is a corner wall which contained severe deterioration on the first 4 feet next to the spillway. The next 10 feet was estimated to be only 10% delaminated while the front of the corner wall (facing the canal, panel #1) contained no delaminations.

Of the 1st 18 panels of the south wall (from west to east), 8 contained no detectable delaminations, 5 were 30-50% delaminated, and 5 were 5-20% delaminated.

The eastern third of the south wall (panels #19-30) and the Holley Waste Gate and Weir were constructed with concrete containing crushed Medina sandstone coarse aggregate. These concrete areas generally appeared to be in poor condition. Although panel #19 contained no detectable delaminations, panels #20-30 contained major deterioration ranging from extensive delaminations to the top third of the wall falling into the canal. Some of these panels were too dangerous to walk under as the walls had cracked horizontally 3-6 feet below the top and moved inward about 1 foot. Depressions up to 3 feet deep existed in the embankment directly behind the wall. Previous concrete repairs and sections of the wall have fallen into the canal and other pieces were now loose and ready to fall.

East End of South Wall
Holley Trough

East End of South Wall
Top of Wall Falling Into Canal
Holley Trough

Looking East, East End of South Wall
Note depressions behind wall
Holley Trough

East of panel #30 is the Holley Waste Gate and Weir. East of the weir, the south slope was lined with a 12 inch thick concrete slab for 450 feet. The slab appeared to be in fair condition with open cracks and joints.

The 4 cores were all obtained from the south wall; 2 from gravel aggregate wall panels and 2 from Medina sandstone aggregate wall panels.

Cores #1 and 2 were taken approximately 120 feet and 250 feet west of the waste gate from sandstone aggregate wall panels. Both cores contained deterioration 20 inches deep. Although it contained 1 or 2 small fractures, the best section of Core #1 had a compressive strength of only 1680 p.s.i.

Core #3 and 4 were taken approximately 700 feet and 500 feet west of the waste gate from gravel aggregate wall panels. These cores contained deterioration only 5-6 inches deep. Core #4 had a compressive strength of 6265 p.s.i.

CONCLUSION

Generally, the north wall and the western two-thirds of the south wall were in good condition and contained only localized deterioration. The eastern third of the south wall contained wall areas of very extensive deterioration and repairs are needed.

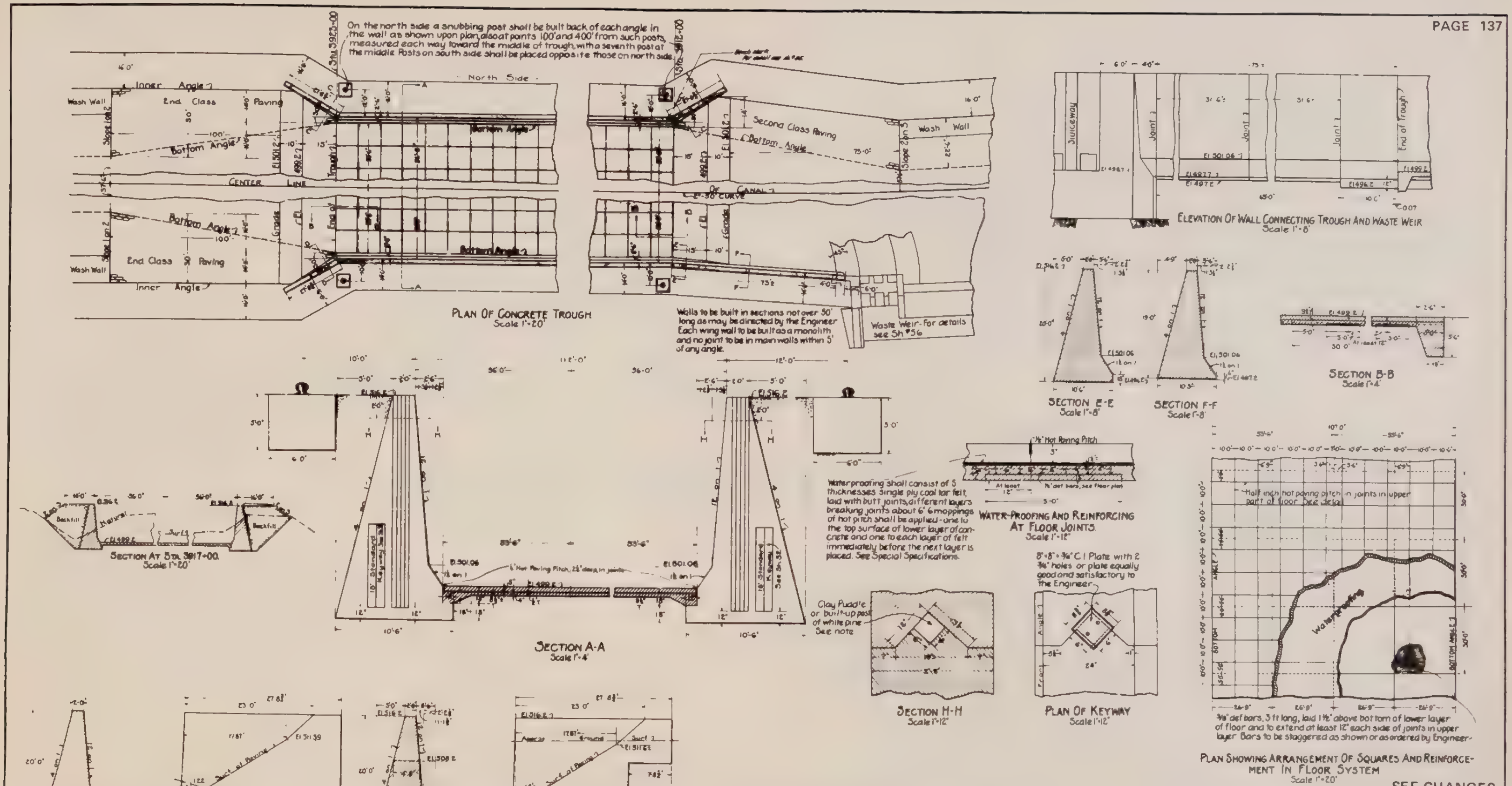
South Wall, Two Types of Aggregates
Medina Sandstone on Left, Gravel on Right
Holley Trough

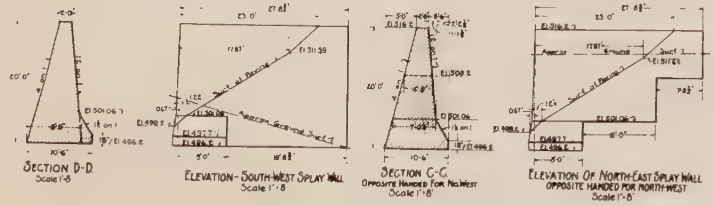
West Half of South Wall, Looking West
Holley Trough

Holley Spillway at West End of South Wall
Note 3 foot cap on top of old spillway
Holley Trough

HOLLEY TROUGH

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	South Wall, 120' West of Waste Gate, 4' From Bottom	1/2"	20"	At 12"	23"	23½"	Hollow sounding area.
2	South Wall, 250' West of Waste Gate, 4' From Bottom	1/4"	20"	At 12" and 16"	22"	22"	Hollow sounding area.
3	South Wall, 700' West of Waste Gate, 4' From Bottom	0	6"	At 13"	19½"	19½"	Wall looked good. Some deep scaling at top of wall.
4	South Wall, 500' West of Waste Gate, 4' From Bottom	0	5"	At 7"	18"	18"	Wall looked good.





NOTES.

The concrete in retaining walls and floor is to be paid for as Second Class Concrete. The metal reinforcement is to be paid for separately.

The material under the floor of the trough is to be thoroughly compacted before concrete is deposited. All unsuitable material is to be removed and replaced by material satisfactory to the Engineer.

All exposed edges of concrete to be rounded to a radius of 3" unless otherwise noted.

Joints in wall and floor must not coincide.

The 6"×6" recesses at joints to be filled with clay puddle or built-up wooden post of white pine as ordered by the Engineer. See Special Specifications.

Exact limits of paving are to be determined by the Engineer.

The bases of structure shown on this plan are approximate only and may be ordered by the Engineer to be at any elevations or of any dimensions necessary for a proper foundation.

SEE CHANGES
PAGE 138

Contract No. 62.

Erie Canal **Section 10**

Between west line of Monroe County and Eagle Harbor.

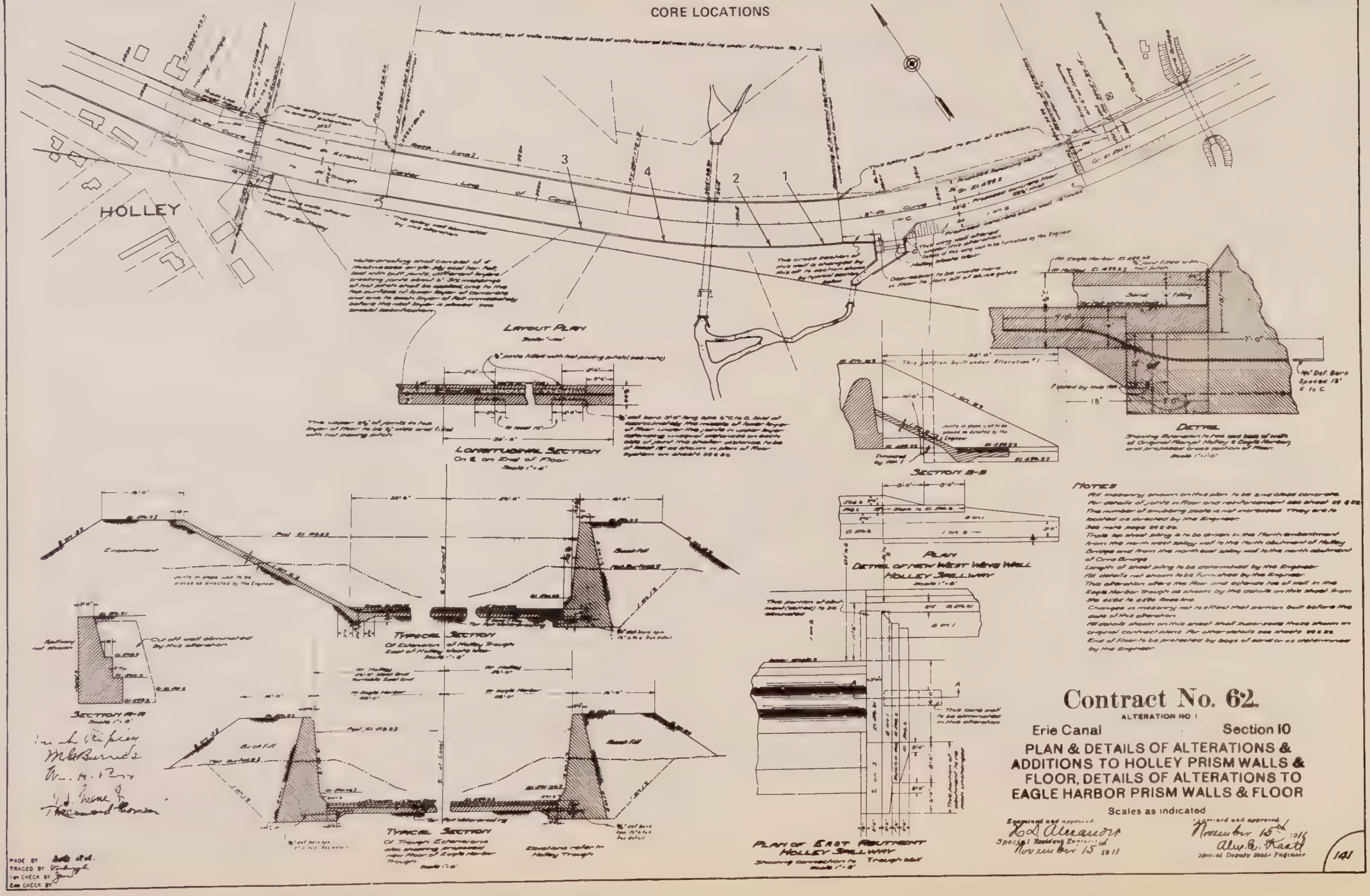
DETAILS OF PRISM WALLS & FLOOR EAST OF HOLLEY, STA. 3912 TO STA. 3923

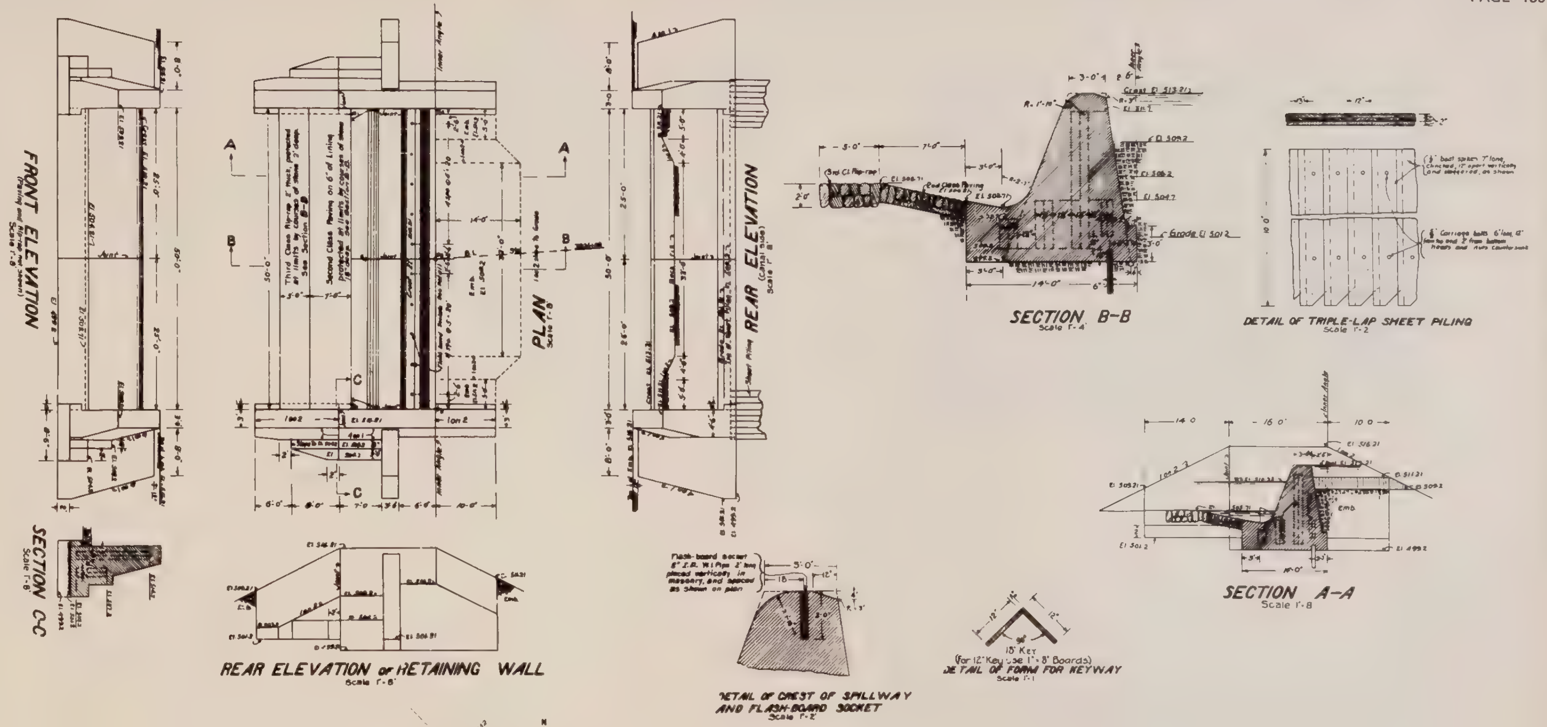
Scales as indicated

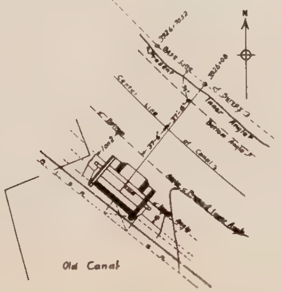
MADE BY
TRACED BY
1ST CHECK BY
2ND CHECK BY

Examined and approved
Mch 7. 1910
Wm B Landreth
Special Deputy State Engineer

29


CORE LOCATIONS
HOLLEY
1
2
3
4
Layout Plan
Longitudinal Section
Detail
Section B-B
Notes
Typical Section
Section A-A
Plan
Detail of New West Wing Wall Holley Spillway
Plan of East Abutment Holley Spillway
Contract No. 62.
ALTERATION NO. 1
Erie Canal
Section 10
PLAN & DETAILS OF ALTERATIONS & ADDITIONS TO HOLLEY PRISM WALLS & FLOOR, DETAILS OF ALTERATIONS TO EAGLE HARBOR PRISM WALLS & FLOOR
Scales as indicated
141





1- The bases of structures shown on the plans shall be considered as approximate only and may be ordered by the State Engineer to be at any elevation or of any dimensions necessary to give a proper foundation.
2- Use second class concrete throughout
3- The sections a a a a and b b b b are to be built as monoliths. Work once begun on a section built as a monolith shall be continued without interruption until completed.
4- Exposed edges of completed structures are to be rounded to a 1" radius unless otherwise shown. Edges at joints are to be rounded to a ½" radius
5- Limits of second class paving are to be protected by double courses of stone 18" deep and payment to be made therefor as second class paving. Limits of third class rip-rap are to be protected by courses of stone 2' deep and payment to be made therefor as third class rip-rap. All as shown on PLAN and SECTIONS A-A and B-B.
6- Both abutments have same dimensions

Contract No. 62.

Erie Canal — Section 10

Between west line of Monroe County and Eagle Harbor

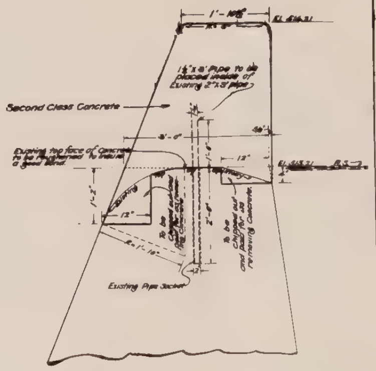
DETAILS OF SPILLWAY AT HOLLEY

STA. 3926+08

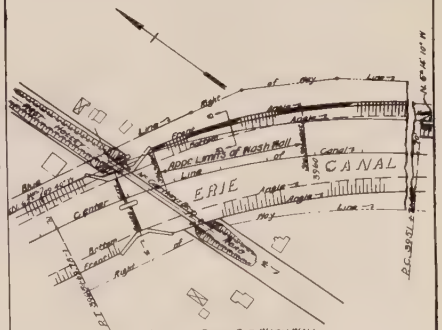
Scales as indicated

MADE BY J. M. Friedland 2-09.
TRACED BY
1st. CHECK BY
2nd. CHECK BY

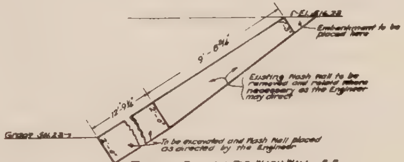
LAYOUT PLAN OF SPILLWAY
Scale: 1" = 100'



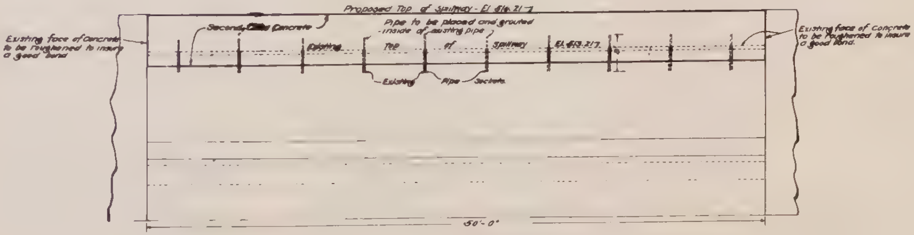
SECTION A-A- OF SPILLWAY
Scale: 1" = 1'
HOLLEY



LAYOUT PLAN FOR WASH WALL
Scale: 1" = 100'
WEST OF HOLLEY.



TYPICAL SECTION FOR WASH WALL - B-B.
Scale: 1" = 3'



ELEVATION OF SPILLWAY
Scale: 1" = 4'
HOLLEY.

Contract No. 200

Erie Canal Sections 9 & 10.

Driving piling etc., between Rochester and Lockport

DETAILS OF ADDITIONAL CONCRETE AT HOLLEY SPILLWAY & WASH WALL WEST OF HOLLEY

Scales as indicated

Examined and approved
December 24 1918
[signature]
Division Engineer

Made By L G Fisher Dec '18
Traced " J V Lewis Dec "
Checked " ...

3

Just west of Albion, the Barge Canal is carried across the 60 foot high embankment over Otter Creek (Culvert #86) in a concrete trough. Constructed between 1911 and 1913 under Contract 62, the trough is 96 feet wide and 500 feet long.

The original floor of the trough was designed as a double layer waterproofed slab, but this design was modified under Alteration #1 (Nov. 1911) as a result of the problems encountered at Bushnell Basin.

On April 1, 1976, the trough was inspected. At this time, the center of the trough floor was covered with 6 inches of water and the sides were covered with mud up to 2 feet deep which prevented its complete inspection.

The majority of both the north and south walls appeared to be in good condition with only a few small areas of scaling. However, the top 2 feet of the walls did contain some cracks and scaled areas. Of the sixteen 30 foot long panels on each wall, only seven panels on each wall contained areas of efflorescent covered cracks. When tapped with a hammer, however, most of these panels did not sound delaminated as the cracks were still very tight.

On the north wall, 1 of the 2 splaywalls at both ends sounded

North Wall, Looking East
Eagle Harbor Trough

North Wall, Looking West
Note sheet piling protruding above water.
Eagle Harbor Trough

approximately 40% delaminated. The east corner of the north wall also contained a large spall. Deterioration at this location may have been initiated by a barge hitting the corner area.

On the south wall, the surface area of one panel was estimated to be 10% delaminated and six others were 5% or less. At the east end, the corner splaywall had vertical cracks at the third points and the adjacent wall panel had a vertical crack at the center.

At the west end of the south wall, the first section of splaywall and the corner splaywall had horizontal cracks at mid-height and below. A vertical crack, which was about 1/2 inch wide at the bottom, existed on the first section of wall and the second panel had a wide horizontal crack near the top of the wall which had been patched. The third panel had a 3 foot by 1 foot wide spall in the upper left corner and all except the first section of splaywall were anchored into the embankment. Notches in the wall indicated that timber supports or braces had been used to temporarily hold up this section of wall while repairs were made. One of these timber supports was still intact. Steel rods near the top of the wall now seemed to anchor it into the embankment. Also, timbers were buried in the mud along the wall and this wall section was out of alignment by over 8 inches.

South Wall, Looking West
Eagle Harbor Trough

South Wall, Looking East
Eagle Harbor Trough

What was of present concern, however, was a 1 foot wide by 10 foot long hole which extended under the corner splaywall. In front of this splaywall, the trough floor (covered with water) had dropped over 2 feet lower than that at the center of the trough. Although both ends of the trough had been sheetpiled, no sheetpiling was seen behind the walls and there was the possibility that water could be leaking under the wall or down through the floor and out the embankment. An inspection of the embankment in this area revealed no sign of any past or present leakage.

Since no one knew when or what had actually occurred at Eagle Harbor, a search of the old reports was begun. In a 1927 Superintendent of Public Works Report, the following was found:

Break at Eagle Harbor

"In the afternoon of August 3, 1927, a break occurred in the canal bank near Eagle Harbor. At this location the canal is carried in a concrete trough resting on a high earth fill across a ravine. The nearest guard gates were closed as soon as possible, but the water rushed through the crevasse and tore out a large section of the bank and a considerable portion of the concrete trough. The culvert underneath the embankment was soon filled with stones, silt and other material to such an extent that the flow of water was practically stopped. The canal water formed a lake on the south side of the canal about 2½ miles long and in places was more than 50 feet deep. Because of the plugged culvert it was four days before the water in the canal was sufficiently lowered so that the bottom was exposed. Plans were made for the immediate assembling on the job of all available Department personnel and equipment. The Highway division placed at our disposal all men and equipment in the vicinity and this help was most valuable and in addition contractors' plant was hired.

Southwest Corner, Area of 1927 Failure
Eagle Harbor Trough

Southwest Corner, Note anchor bolt heads 2 feet below top of wall and large hole under corner wall. Water covered floor drops 2 feet by sheet piling.

Looking East along South Wall from West End
Note inward movement of wall in foreground

In order to reach the site of the break it was necessary to build a bridge across a nearby spillway for trucks and equipment. To give a means of access for trucks, pile drivers and other equipment to the canal bed, an inclined timber trestle was built from the canal bank down to the trough. Several timber turnouts for trucks were built. To restore the earth embankment lying back of the side wall and to fill up the hole beneath the floor of the trough, required the replacement of approximately 25,000 cubic yards of material, which was entirely placed within nine working days.

To hold the new bank, two parallel rows of steel sheet piling were driven through the new fill and continued well into the stable banks on each side. Cut-off walls of steel sheet piling were also driven across the canal bed at both ends of the concrete trough in order to prevent future undermining. The concrete side wall had not gone out and this was shored up by heavy timbering. The hole in the bottom of the canal was sealed with a clay puddle.

During the repair work persistent efforts were made to open the culvert under the canal by the use of explosives, excavators, drag lines, etc., but the culvert still remained plugged after the work was completed and water turned back into the canal.

The canal was refilled and the first boat passed over the break at 3:30 A.M., August 22nd. This was a difficult repair job and was carried out most efficiently and in the shortest possible time. Work was carried on night and day and the Department organization functioned especially well. Competent observers on first seeing the break said it could not possibly be repaired in less than six weeks' time, but it was actually done in less than half that time."

Also, in the 1928 Report, the following additional information was found:

"The temporary repairs made to restore navigation following the break at Eagle Harbor last year included diagonal braces in front of the trough walls. These braces obstructed navigation in the south half of the channel. During the period when the Sixty-Mile Level was unwatered for the annual spring inspection and cleaning of the prism, the wall was underpinned by placing steel beams supported on timber piles and the diagonal braces were removed."

Since no mention was made of the anchoring system, this work must have been done later. The anchor rods were located about 2 feet below the tops of the wall and were undoubtedly attached to the sheetpiling driven behind the walls in the embankment. Presently, however, the ends of some of the anchor rods have rusted so seriously that the anchor rod heads have fallen off.

During the week of April 19, 1976, the hole under the corner splaywall was filled with concrete by Canal Maintenance Forces.

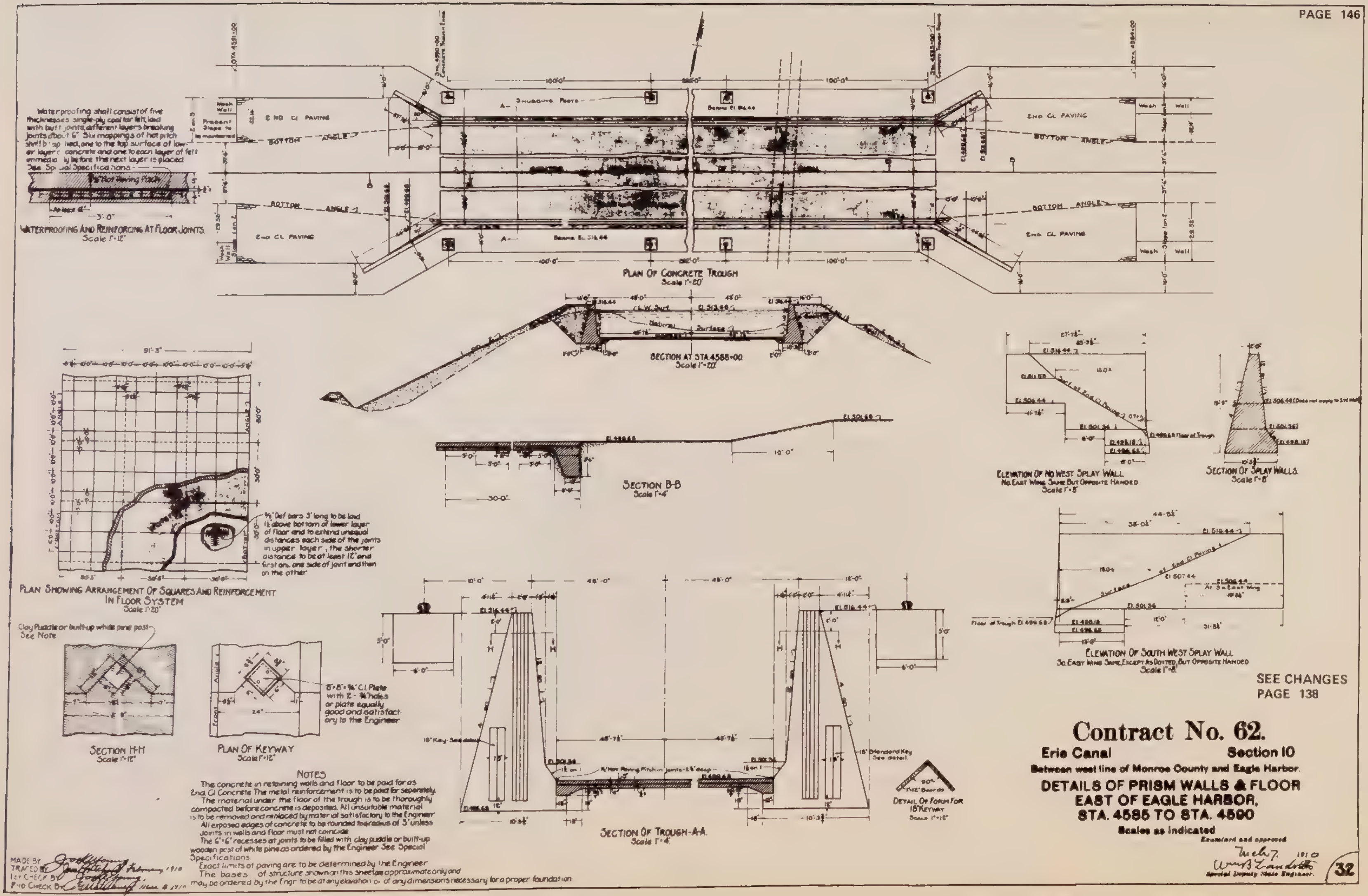
On April 29, 1976, two cores were taken from south wall panels that sounded solid, but contained efflorescent covered cracks. Core #1, from the 6th, and Core #2 from the 4th wall panel from the west corner splaywall, both contained very tight cracks up to 1 foot deep into the wall.

CONCLUSION

The Eagle Harbor Trough still is in good condition, except for the area that failed in 1927. As the anchor rod heads fall off, this short section of wall could start moving inward due to soil pressure behind the wall and the presence of more voids underneath or an unstable foundation. This area needs watching and possible repairs.

EAGLE HARBOR TROUGH

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	South Wall, Middle of 6th Panel From West End, 4' Above Ground	0	6"	0	15"	15"	Small cracks covered with efflorescence, solid sounding area.
2	South Wall, 4th Panel From West End, 10' From East End of Panel, 4' Above Ground	0	10"	At 16"	21½"	21½"	Small cracks covered with efflorescence, solid sounding area.



Waterproofing shall consist of five thicknesses single-ply coal tar felt, laid with butt joints, different layers breaking joints about 6" Six moppings of hot pitch shall be applied, one to the top surface of lower layer of concrete and one to each layer of felt immediately before the next layer is placed. See Special Specifications
½" Hot Paving Pitch
At least 12"
3'-0"
WATERPROOFING AND REINFORCING AT FLOOR JOINTS
Scale 1"=12"
STA 4581+00
STA 4584+00
Snubbing Posts
End Cl Paving
Bottom Angle
Wash Wall
Present Slope to be maintained
100'-0"
Beams El 316.44
PLAN OF CONCRETE TROUGH
Scale 1"=20'
C.L.W. Surf.
Natural Surface
SECTION AT STA 4588+00
Scale 1"=20'
PLAN SHOWING ARRANGEMENT OF SQUARES AND REINFORCEMENT IN FLOOR SYSTEM
Scale 1"=20'
¾" Def bars 3' long to be laid 1½ above bottom of lower layer of floor and to extend unequal distances each side of the joints in upper layer, the shorter distance to be at least 12" and first on one side of joint and then on the other
SECTION B-B
Scale 1"=4'
ELEVATION OF NO. WEST SPLAY WALL
No. East Wing Same But Opposite Handed
Scale 1"=8'
SECTION OF SPLAY WALLS
Scale 1"=8'
ELEVATION OF SOUTH WEST SPLAY WALL
So. East Wing Same, Except As Dotted, But Opposite Handed
Scale 1"=8'
Floor of Trough El 498.68
Clay Puddle or built-up white pine post - See Note
SECTION H-H
Scale 1"=12"
PLAN OF KEYWAY
Scale 1"=12"
8"×8"×¾" C.I. Plate with 2 - ¾" holes or plate equally good and satisfactory to the Engineer
18" Key - See detail
18" Standard Key See detail
½" Hot Paving Pitch in joints - 2½" deep
SECTION OF TROUGH - A-A
Scale 1"=4'
DETAIL OF FORM FOR 18" KEYWAY
Scale 1"=12"
NOTES
The concrete in retaining walls and floor to be paid for as 2nd Cl Concrete. The metal reinforcement is to be paid for separately.
The material under the floor of the trough is to be thoroughly compacted before concrete is deposited. All unsuitable material is to be removed and replaced by material satisfactory to the Engineer
All exposed edges of concrete to be rounded to a radius of 3" unless
Joints in walls and floor must not coincide.
The 6"×6" recesses at joints to be filled with clay puddle or built-up wooden post of white pine as ordered by the Engineer. See Special Specifications
Exact limits of paving are to be determined by the Engineer
The bases of structure shown on this sheet are approximate only and may be ordered by the Engr to be at any elevation or of any dimensions necessary for a proper foundation
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
February 1910
SEE CHANGES PAGE 138
Contract No. 62.
Erie Canal
Section 10
Between west line of Monroe County and Eagle Harbor.
DETAILS OF PRISM WALLS & FLOOR EAST OF EAGLE HARBOR, STA. 4585 TO STA. 4590
Scales as Indicated
Examined and approved
1910
Special Deputy State Engineer.
32

MEDINA TROUGH

The Medina High Wall forms the majority of the north side of the trough at Medina. It extends from the Medina Aqueduct (Culvert 99) westward 1614 feet along the Oak Orchard Creek Gorge. Wall height varies from 25 to 35 feet and it is composed of massive concrete monoliths 21 to 28 feet wide at the bottom which taper up toward the top. The top of the north wall widens out to form the towpath roadway. All monoliths are keyed into bedrock.

On the south side, a 260 foot long section of the high wall exists between Culvert 99 on the east end and the Medina Waste Weir at the west end.

Between the trough walls, the canal has been backfilled with stone rubble to within 14 feet of the wall top.

East of Culvert 99 and west of Oak Orchard Creek Gorge, the canal is confined by concrete retaining walls, and these walls have wide earth fill areas behind them. No attempt was made to inspect these walls other than to note that they appeared to be in the same general condition as the inside faces of the trough walls.

Looking East Across Oak Orchard Creek Gorge North Wall of Medina Trough and Culvert 99 exit on right. Oak Orchard Creek Waterfall at left center.

Looking West Along North Trough Wall Culvert 99 Exit at bottom left and Medina Falls at right.

North Side of Trough Wall West of Culvert 99 Surface cracked and stained. West of this area, the north wall is mostly obscured by trees and underbrush.

The north face of the north high wall was sounded along the bottom, but only small areas of deterioration were found. One small leak was also found at a construction joint near the center of the north wall. Most of the deterioration on the outside faces of both high walls consisted of surface scaling. The concrete towpath roadway and the railing on top of the north wall were in generally good condition.

The inside wall faces also appeared in good condition, but nearly all wall panels had 1 or more long, narrow areas of up to 1 foot deep scaling. These areas followed horizontal construction joints or cold construction joint lines on the walls. Due to the generally sound appearance and massiveness of the high walls, no cores were taken.

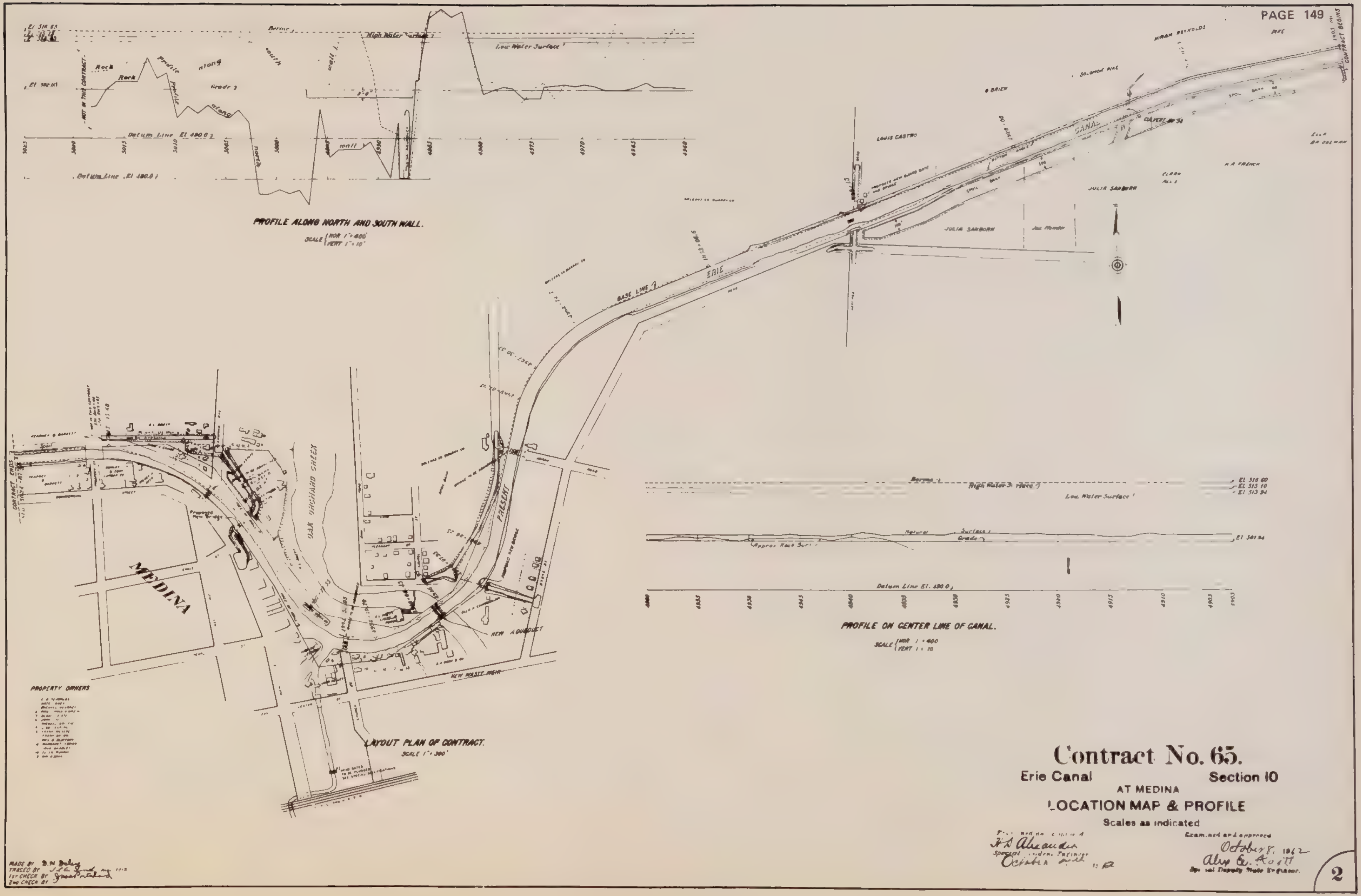
CONCLUSION

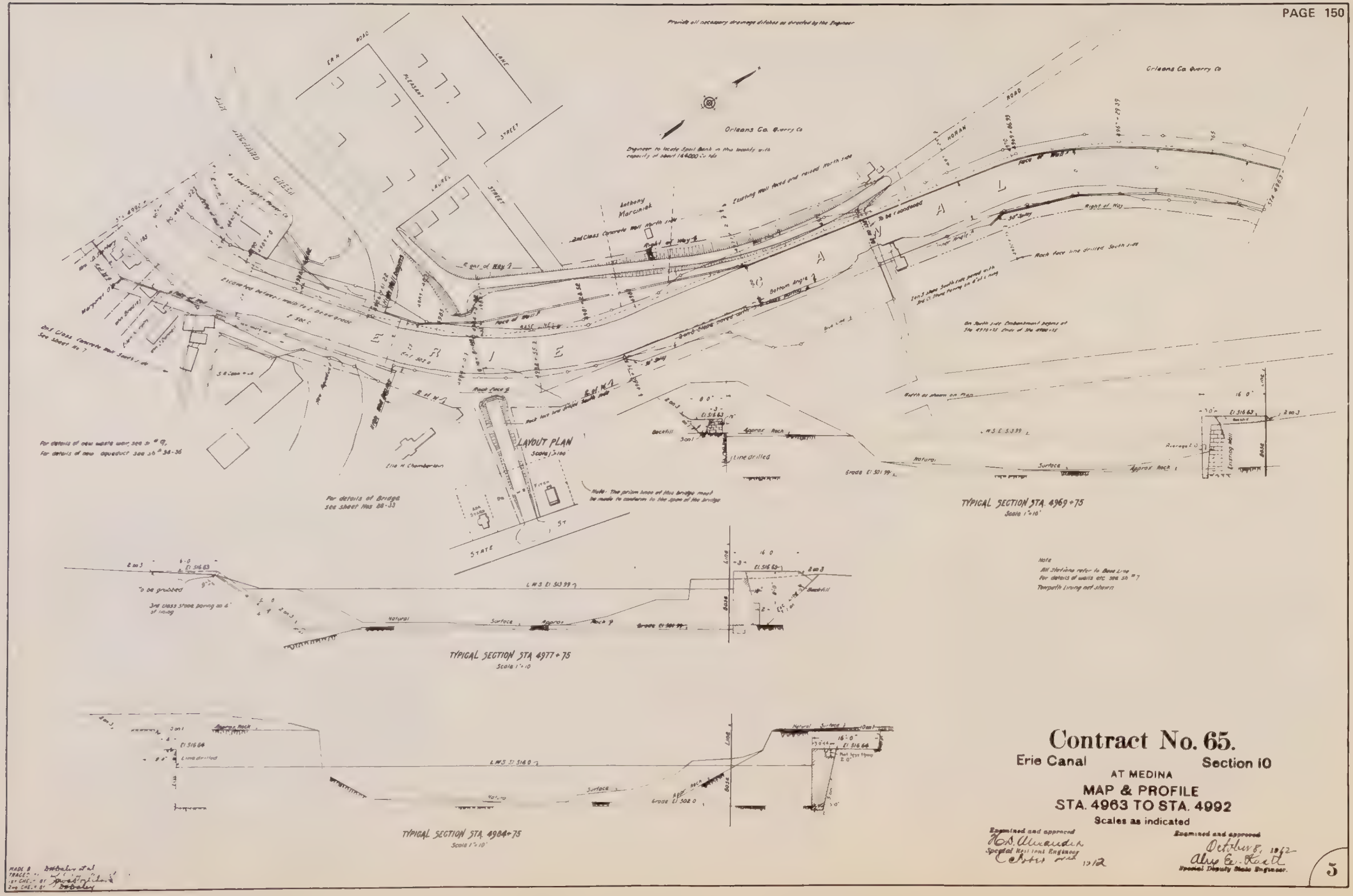
Except for pockets of scaling on the insides of the trough walls and surface scaling on the outsides, the walls appeared to be in good condition. No repairs other than to possibly small areas of deterioration are anticipated. However, most wall surface areas could use a durable cosmetic treatment to eliminate the unsightly scalings.

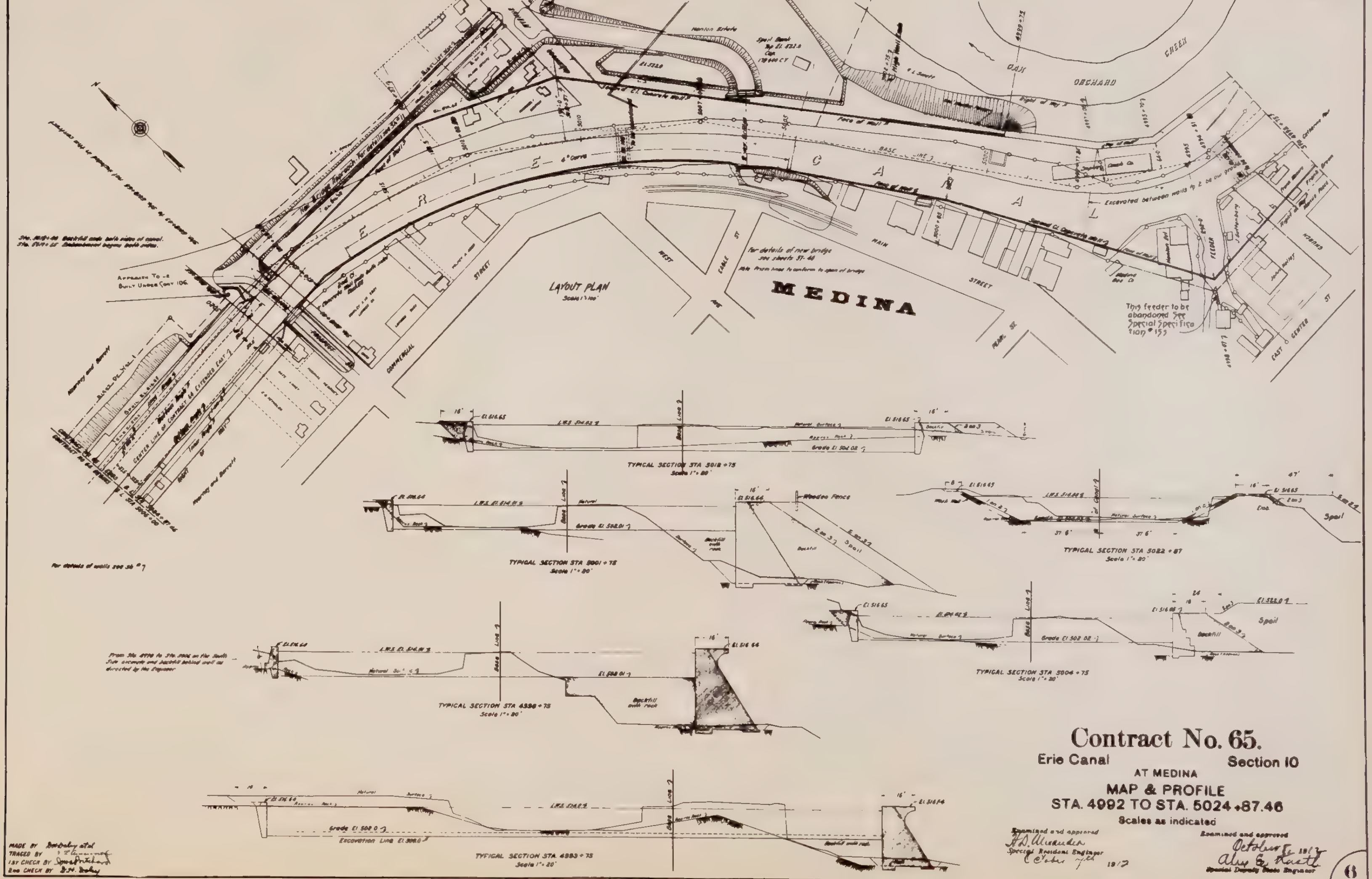
Looking West Along South Trough Wall
Culvert 99 Entrance at bottom of wall. Surface cracked and stained.

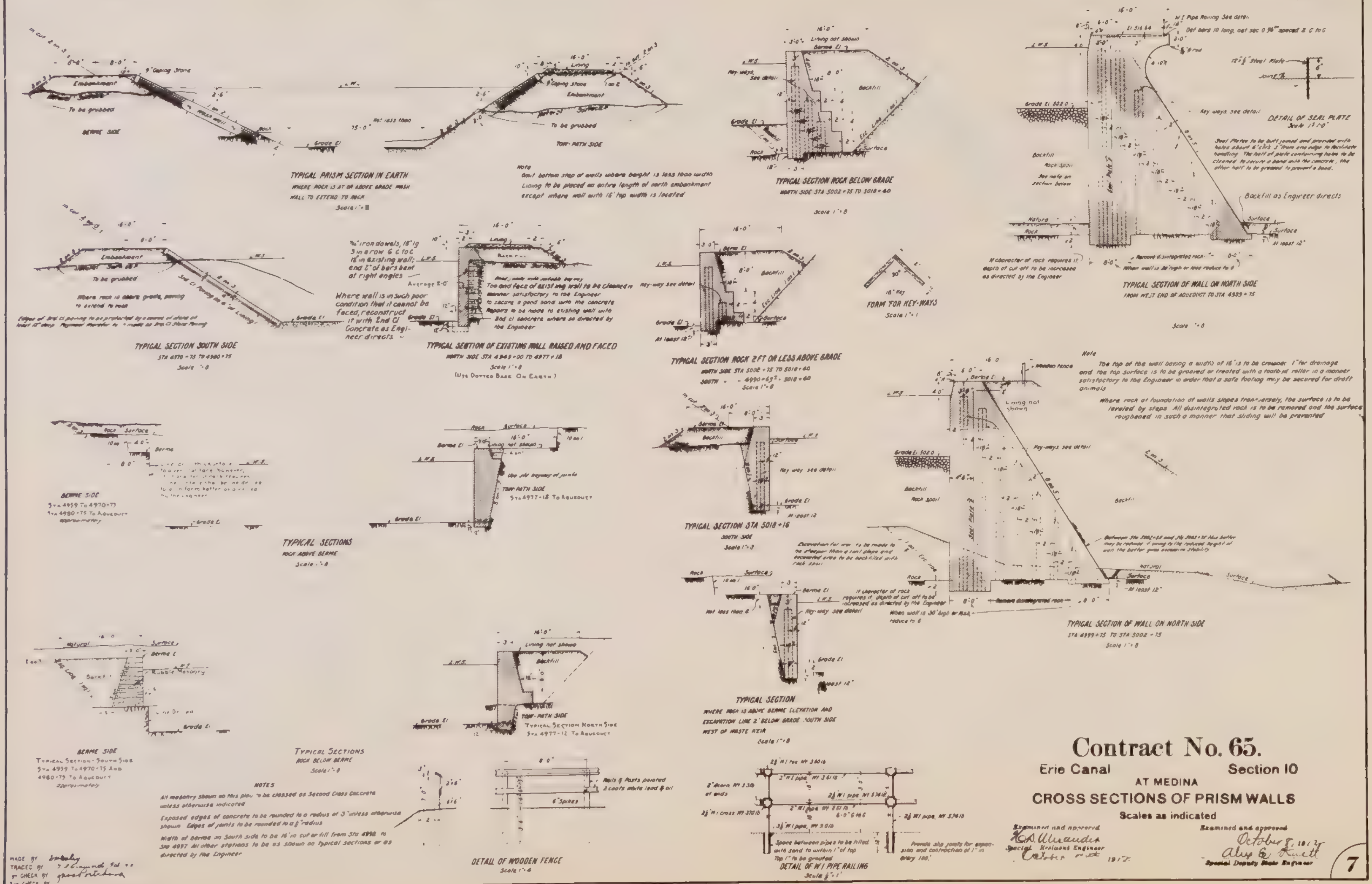
South Face of Trough North Wall
Horizontal deep scale areas and joint lines along wall. Medina Harbor at left. Medina Gorge beyond wall on right.

Looking East From Medina Harbor
Medina Weir and Waste Gate on right. Note deep scale areas along both walls.


PROFILE ALONG NORTH AND SOUTH WALL.
Datum Line El 490.0
Low Water Surface
High Water Surface
LAYOUT PLAN OF CONTRACT.
SCALE 1" = 300'
MEDINA
OAK ORCHARD CREEK
NEW AQUEDUCT
NEW WASTE WEIR
ERIE CANAL
BASE LINE
PRESENT
PROPERTY OWNERS
CONTRACT ENDS
CONTRACT BEGINS
PROFILE ON CENTER LINE OF CANAL.
Datum Line El. 490.0
Contract No. 65.
Erie Canal
Section 10
AT MEDINA
LOCATION MAP & PROFILE
Scales as indicated
Special Deputy State Engineer
2


Provide all necessary drainage ditches as directed by the Engineer
Orleans Co. Quarry Co
Orleans Co. Quarry Co
LAYOUT PLAN
For details of Bridge see sheet Nos 28-33
For details of new waste weir see sh. # 9
For details of new aqueduct see sh. 34-36
TYPICAL SECTION STA. 4969+75
Scale 1"=10'
TYPICAL SECTION STA 4977+75
Scale 1"=10'
TYPICAL SECTION STA. 4984+75
Scale 1"=10'
Note
All Stations refer to Base Line
For details of walls etc see sh. # 7
Towpath Lining not shown
Contract No. 65.
Erie Canal
Section 10
AT MEDINA
MAP & PROFILE
STA. 4963 TO STA. 4992
Scales as indicated
Examined and approved
Special Assistant Engineer
Examined and approved
Special Deputy State Engineer.
5


LAYOUT PLAN
MEDINA
ORCHARD
CREEK
MAIN
STREET
COMMERCIAL
This feeder to be abandoned See Special Specification # 155
TYPICAL SECTION STA 5018+75
TYPICAL SECTION STA 5001+75
TYPICAL SECTION STA 5022+87
TYPICAL SECTION STA 5004+75
TYPICAL SECTION STA 4996+75
TYPICAL SECTION STA 4993+75
Contract No. 65.
Erie Canal
Section 10
AT MEDINA
MAP & PROFILE
STA. 4992 TO STA. 5024+87.46
Scales as indicated
Examined and approved
Special Resident Engineer
Examined and approved
Special Deputy State Engineer
MADE BY
TRACED BY
1ST CHECK BY
2ND CHECK BY



NOTES

All masonry shown on this plan to be classed as Second Class Concrete unless otherwise indicated

Exposed edges of concrete to be rounded to a radius of 3" unless otherwise shown. Edges of joints to be rounded to a ½" radius

Width of berme on South side to be 16' in cut or fill from Sta 4998 to Sta 4997. All other stations to be as shown on typical sections or as directed by the Engineer

MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY

Contract No. 65.

Erie Canal — Section 10

AT MEDINA

CROSS SECTIONS OF PRISM WALLS

Scales as indicated

Examined and approved
H. A. Uhrlaender
Special Resident Engineer
October 1912

Examined and approved
October 8, 1912
Alex E. Kuett
Special Deputy State Engineer

LOCKS AT LOCKPORT

Prior to construction of the Barge Canal, two flights of locks, each consisting of 5 locks, existed at Lockport. Under Contract 67 (1910 - 1913), the south flight was removed and Locks 34 and 35 were were constructed in tandem. Lock 34 has a lift of 24.6 feet and Lock 35 has a lift of 24.5 feet (total lift is 49.1 feet). Both locks rest on bedrock in a narrow excavated gorge.

Due to verbal reports of the rock gorge slowly moving back together and causing cracks and lock floor buckling, an inspection was made on April 1, 1976. At this time, the floor of Lock 35 was nearly free of ice and water as it drains into Lock 34. Unless pumped out, the floor of Lock 34 can not be inspected as it is always covered with a few feet of water.

The floor of Lock 35 appeared to have buckled from extreme pressures. Concrete slabs were cracked and tilted throughout. Some slabs were nearly 2 feet above others and numerous 1 foot deep holes existed. Also, it appeared that some damage had been caused by extreme turbulence on the lock floor. At a few of the port openings, 8 foot square concrete pads had been placed in the concrete floor. According to Region personnel, the floor of Lock 34 is similar to Lock 35.

Inspection of Contract 67 plans revealed that the original design of the lock floor was for 8 foot wide by 10 foot long by 2 foot thick concrete pads or aprons to be placed at the exit of each port. However, if the bedrock was "soft", the contractor was to extend the aprons as directed by the State Engineer.

According to a note on Alteration #2 (March 1913) plans, the contractor placed a 2 foot thick concrete floor throughout Lock 35. This brought the lock floor to elevation 525.0 or approximately 1.5 feet below the port openings.

Soon after completion of Contract 67, cracks and other deterioration began in the Lock 35 upper gate area. By 1917, major repairs were needed and contract plans were completed. Possibly as a result of indecision as to what was causing the problems and the proper corrective action, these plans were twice revised. Finally, on November 15, 1919, Contract 152 was awarded and all work was completed by May 10, 1920.

The 1920 State Engineer's Report contained the following description of this problem:

> "Since first being in use, the upper end of the tandem locks at Lockport had shown some deterioration, evidently due to the action of water in the vertical drop through the feed culvert back of the upper valves. In order to prevent a possible failure during the navigation season, the upper breast wall and about 200 feet of the lock walls were removed and rebuilt of heavier section and the drop in the feed culvert was placed in front of the valves."

Soon afterwards, additional cracks and problems developed in the locks. In 1925, survey stations were set along both locks and at 5 foot height intervals on the walls. The distance between the vertical lock walls was then accurately measured at over 100 points.

The average distance between the Lock 35 walls was found to be 44.5 feet. As the lock walls were originally constructed 45.0 feet apart, this meant the walls were now 0.5 foot closer together. Between 1925 and 1969 (latest data), the walls moved together another 0.3 foot for a total of 0.8 foot.

Lock 34 differs from Lock 35 in that the eastern end is not in a rock cut. The western end of Lock 34 was found to be approximately 0.4 foot less in width than originally constructed whereas the eastern end was only 0.15 foot less. Between 1925 and 1948 (latest data), the western end moved an additional 0.15 foot while the eastern end moved only 0.05 foot.

This phenomenon of rock cut walls moving closer together has only recently been completely understood. Basically, the deep rock cut provides a place where built-up stress within the rock can be relieved. The most relief or movement occurs soon after the cut is made, but it continues at a decreasing rate indefinitely.

Since 1920, periodic repairs have been made to the lock sills and other areas as cracks and other problems developed.

Lock 35 is the only lock with a double set of doors and no buffer beam to prevent Canal traffic from damaging the doors. (Buffer beams are no longer used.) The apparent reason for this is a fluctuating water level. East of Lock 35, the canal water level is controlled by man and only small variations are possible. West of Lock 35, the water level is primarily controlled by the height of the Niagara River which is fed from Lake Erie. Past history indicated wide fluctuations in the Niagara River due to unusual weather conditions. Strong easterly winds blowing across Lake Erie push the lake water westward and cause the Niagara River to drop. (The 1933 State Engineer's Report stated that Niagara Falls actually stopped flowing on November 5 due to these unusual winds.) If west winds cause the water to rise, the Pendleton Guard Gate is lowered to protect the Locks at Lockport.

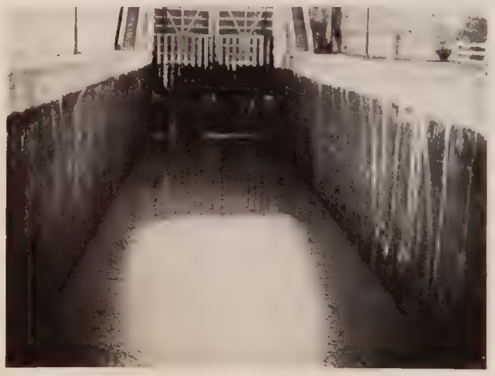
A low water level would allow some early 1900 type barges to pass underneath a buffer beam and hit the lock doors. By constructing a set of outer doors, the inner doors would always be protected. By making the outer doors watertight, they could also serve other functions.

During our initial inspection on February 18, 1976, the walls of Locks 35 and 34 in Lockport appeared in much better condition than those previously evaluated at Locks 33 and 32 in Rochester. As the Lock 34 walls contained only a few small, isolated scaled areas and were obviously still in good condition, no plans were made for any further evaluation of this lock. Lock 35, however, did contain areas of deep deterioration.

Although the floors of both locks have buckled as previously noted, the concrete slabs present no hazard as long as they do not protrude high enough to be struck by canal traffic.

Lock 34 - Looking East

South Wall of Lock 34



Lock 34 - Looking West
Lock 35 doors in background

North Wall of Lock 34

The deterioration on the Lock 35 walls appeared to be concentrated in isolated sections. On the south wall, the majority of the deterioration was on the 2 wall panels at the west end of the lock. This section was rebuilt in 1920 under Contract 152. Another area of deep scaling had occurred near the bottom at the east end, where the wall is recessed to receive the opened lock door. The remainder of the south lock wall contained only a few scattered scaled areas. These areas of deterioration were in the vicinity of either cold or lift joints on the concrete walls.

Looking West - Lock 35 Buckled Floor

On the north lock wall, the western half contained the most deterioration. It was difficult to distinguish a difference between

South Lock Wall - Lock 35, Looking East
Note lack of extensive deterioration

South Lock Wall - Lock 35, Looking West
Note deterioration at west end and buckled floor.

West End of South Lock Wall - Lock 35
Deteriorated areas were rebuilt in 1920

the 3 wall panels at the west end that were rebuilt in 1920 and the adjacent original 1912 section. The east half of the north wall contained only a few scattered scaled areas, and all of these deteriorated areas followed joint lines on the concrete walls.

Between the 2 sets of upper lock doors, the concrete walls have scaled over most of their surface area. These walls were also rebuilt in 1920. Some recent repairs have been made along the top of these walls.

West End of North Wall - Lock 35
Block 68 located in center of photo. Note cracks and repair failures. This area was rebuilt in 1920.

North Wall Between Upper Lock Doors

South Wall Between Upper Lock Doors

North Wall - Lock 35
Note change in surface deterioration halfway along wall

The remains of grout or shotcrete repairs can still be seen clinging to some of the deeper scaled areas next to and on block #68 at the western end of the north lock wall. These repairs may have been made under Contract 152 (Alteration #1) in 1920, but they most likely are of a more recent vintage. Since 1920, repairs have also been made on the concrete sills at both ends of the lock by Canal Maintenance Personnel.

West Sill of Lock 35
Note core hole at left center (upper hole is drain) and leak through lock wall at right.

On September 22, 1976, five cores were obtained from the western end of Lock 35 where the majority of the deterioration existed. Core #3 was taken from the concrete sill below the recently repaired top. This 1920 rebuilt area contained deterioration 11 inches deep and the bottom section of the core had a compressive strength of 5915 p.s.i.

On the south lock wall, Core #4, from the 1920 rebuilt area, contained deterioration 14 inches deep, with the outermost 7 inches previously scaled away. Core #5, from a typical 1912 concrete wall area, contained deterioration 8 inches deep. Since both the rebuilt (1920) and the original wall areas contain concrete with gravel aggregate, the difference in deterioration is probably due to slight changes in the concrete mixture and/or construction procedures.

Sill at West End of Lock 34

On the north lock wall, Core #1 was taken in the upper west corner just above the high water level mark. This 1920 rebuilt area contained deterioration only 3 inches deep. Core #2, 27½ inches long, was taken in a 6 inch deep scaled area where the surrounding concrete contained partially missing repair patches. This core was obtained along either a horizontal cold joint or crack, which had filled in with mineral deposits. The last 6 inch section of this core was limestone block. (Limestone blocks from the previous Erie Canal lock walls were probably used as fillers for the new Barge Canal concrete lock walls).

Block 68 - Lock 35
Area of Core #2. Note core hole.

The area represented by Core #2 was block #68, supposedly rebuilt in 1920 under Contract 152 (Alteration #1). However, other rebuilt areas contained gravel coarse aggregate concrete while Core #2 contained concrete with crushed limestone coarse aggregate. This may indicate that block #68 was not rebuilt as shown on the contract plans, but only repaired. Therefore, Core #2 probably represents the original 1912 construction.

Although no additional cores were taken from the north lock wall, the west half (except for the 1920 rebuilt west corner) appeared to contain concrete with crushed stone aggregate. The concrete performance contrast between the gravel aggregate concrete used in the east half and the crushed stone aggregate used in the west half was very apparent at the vertical joint between port holes #4 and 5 (from eastern end of lock).

Joint Near Middle of Lock 35 North Wall
Crushed limestone aggregate concrete on left. Gravel aggregate on right.

Conclusion

The reason for the apparent differences in deterioration within Lock 35 and between Lock 35 and Lock 34 is not presently known. However, Lock 34 is still in relatively good condition and only isolated repairs are needed. Lock 35 contains isolated areas of deep scaling and delaminations. The majority of the deterioration is presently contained within 15 inches of the original surface. Due to the thickness of the massive lock walls, this noted deterioration is a surface condition which detracts only from the aesthetic value of the structure. Areas of deeper deterioration exist in the area of block #68 and in other small isolated areas which can only be located as future repairs are made. Open vertical joints in the lock walls should also be sealed to prevent leakage into and out of the lock.

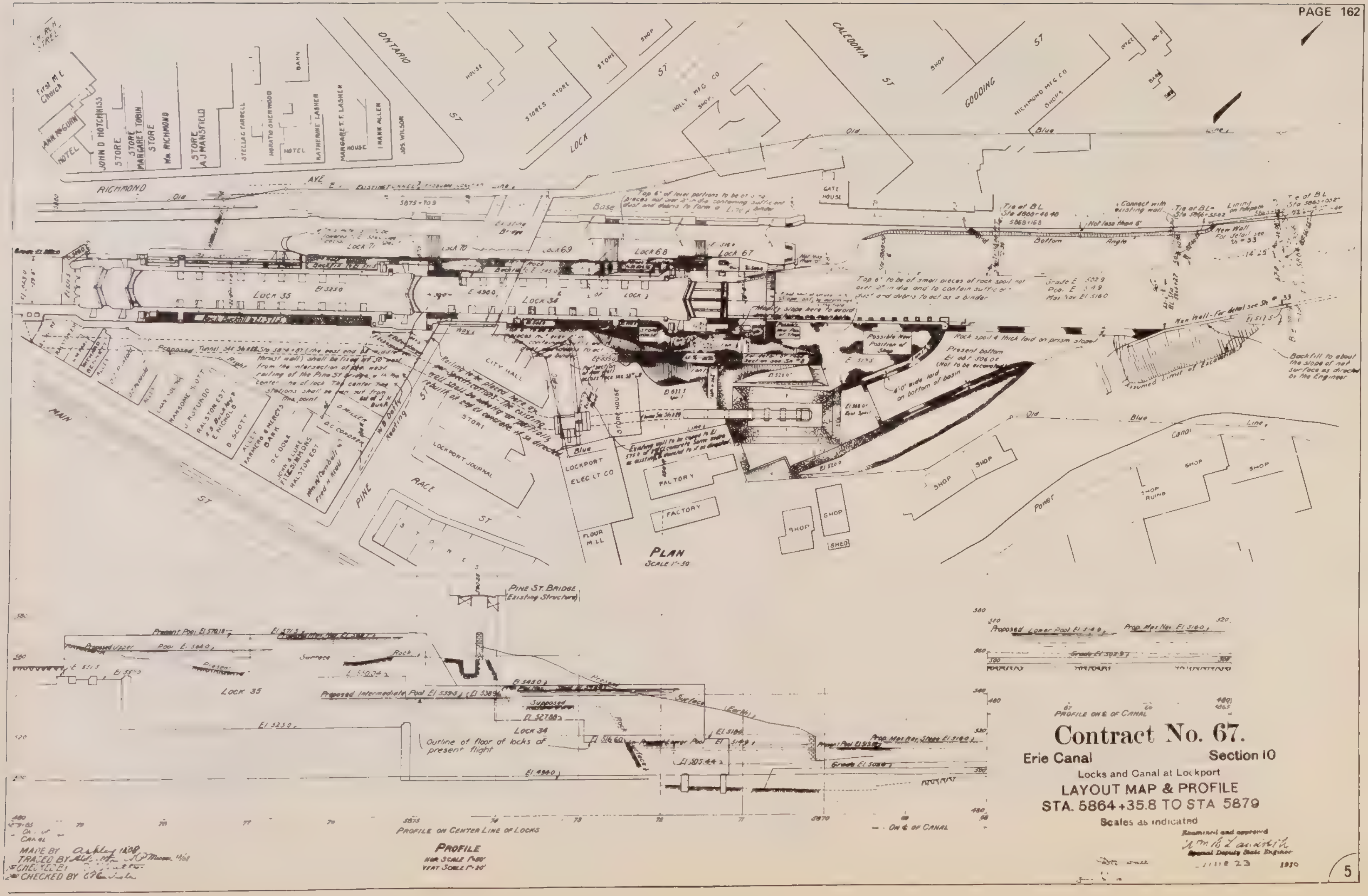
Buckled Floor of Lock 35
Note scaling at right of southeast door and broken floor slabs.

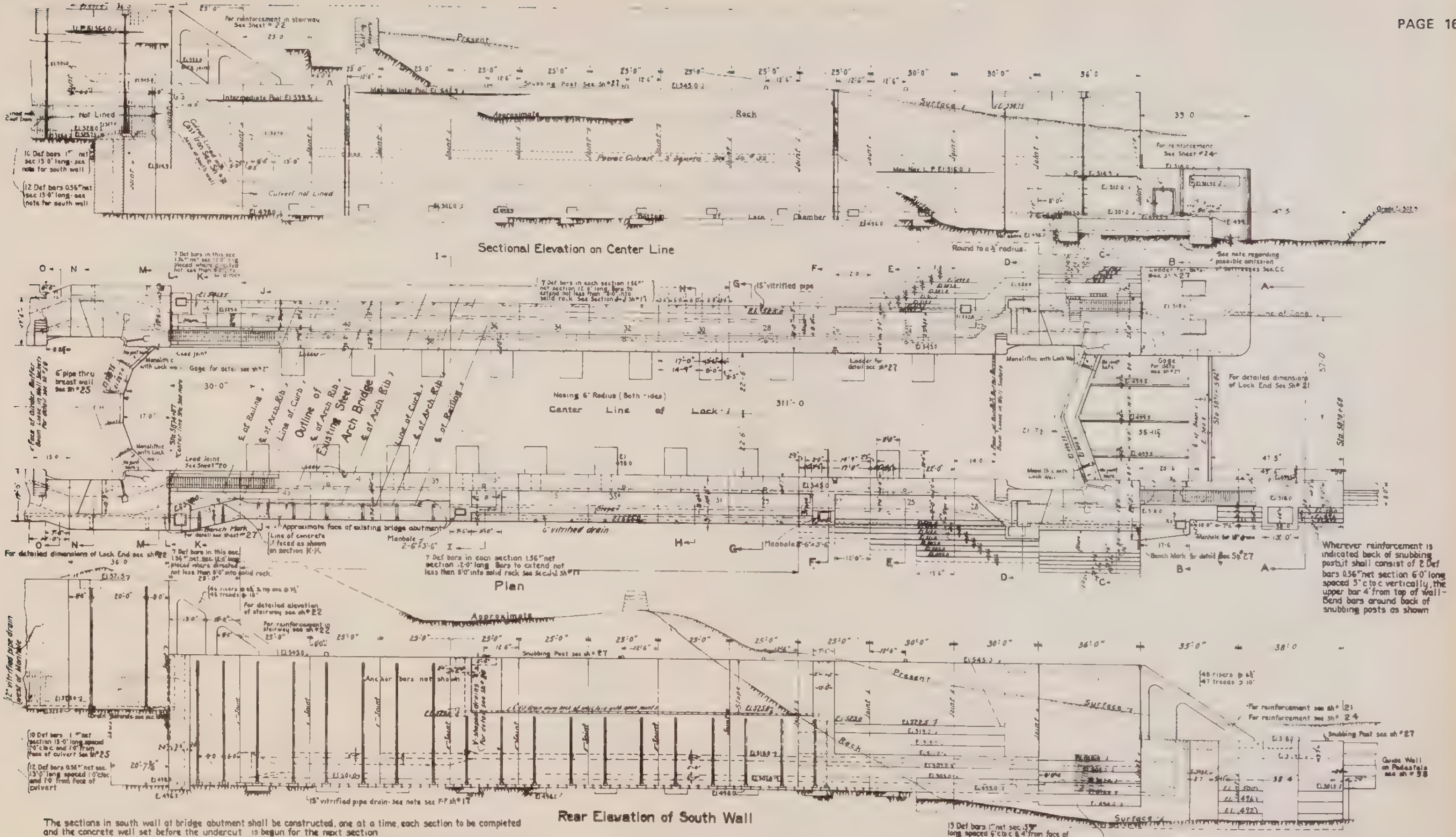
East End of Lock 34 and Erie Lock 67
Note wood floor under stone block lock

Looking East - Lock 35 Entrance

LOCK 35

Core Number	Location	Scaled Depth	Deteriorated Depth	Intentional Breaks	Recovered Depth	Total Depth	Comments
1	North Side, 15' From West Gate, 4' From Top	1"	3"	0	11"	12"	Taken at water line, typical scaling along top.
2	North Side, 58' From West Gate, 25' From Top	6"	33½"	0	27½"	33½"	Deep scaling in this area, drilled along horizontal joint and 6" into limestone block.
3	West Sill, 15' From North Side, 14' Below Top of Sill	2"	11"	At 11"	13"	15"	
4	South Side, 35' From West Gate, 20' Below Top	7"	14"	At 22"	20"	27"	Deep scaling up to 12".
5	South Side, 102' From West End, 25' Below Top	0"	8"	0"	12"	12"	Area typical of 75% of lock wall.


RICHMOND AVE
ONTARIO ST
LOCK ST
CALEDONIA ST
GOODING ST
MAIN ST
PINE ST
RACE ST
HOLLY MFG CO
RICHMOND MFG CO SHOPS
CITY HALL
LOCKPORT JOURNAL
LOCKPORT ELEC LT CO
FACTORY
FLOUR MILL
GATE HOUSE
STORE HOUSE
LOCK 35
LOCK 34
LOCK 71
LOCK 70
LOCK 69
LOCK 68
LOCK 67
Old Blue Line
Old Blue Canal Line
Power Canal
Possible New Position of Shop
Rock spoil 4 thick laid on prism slopes
Assumed Limit of Excavation
Backfill to about the slope of net surface as directed by the Engineer
PLAN
SCALE 1"-50
PINE ST. BRIDGE
(Existing Structure)
Present Pool El 570.10
Proposed Upper Pool El 564.0
Proposed Intermediate Pool El 539.5
Proposed Lower Pool El 514.9
Prop. Max Nav. El 516.0
Outline of floor of locks of present flight
PROFILE ON CENTER LINE OF LOCKS
PROFILE ON ℄ OF CANAL
PROFILE
HOR. SCALE 1"=50'
VERT. SCALE 1"=20'
Contract No. 67.
Erie Canal
Section 10
Locks and Canal at Lockport
LAYOUT MAP & PROFILE
STA. 5864+35.8 TO STA 5879
Scales as indicated
Examined and approved
Special Deputy State Engineer
MADE BY
TRACED BY
CHECKED BY
CHECKED BY



The sections in south wall at bridge abutment shall be constructed, one at a time, each section to be completed and the concrete well set before the undercut is begun for the next section

Rock faces against which masonry is to rest are to be channeled unless otherwise directed by the State Engineer in writing

If the rock is soft the contractor shall extend the floor aprons in front of the ports to the amount directed by the State Engineer in writing

Where springs or leakage is encountered additional drains are to be put in where directed by the Engineer

Figures enclosed thus ⊏ are index numbers indicating sections.

The uppermost six feet of sections No 20, 21, 46 and 47 shall be built as monoliths and work once begun thereon shall be continued without interruption until the section is completed, also section 19 within limits $X_1 X_2 X_3$ and X_4 from El 506.0 to El 518.0 shall be built as a monolith in the same manner

Sta 5874+87 (the east end of middle thrust wall) shall be fixed at 30'-0" west from the intersection of the west railing of the Pine St Bridge with the center line of lock. The center line stations shall be run out from this point. All stations shown on this plan are center line stations

The west wing of the existing south abutment of bridge projects from the end of the main abutment over the site of the south wall of lock #34; This wing wall shall be connected with the new masonry as the Engineer shall direct or it may be partially or entirely reconstructed if in the opinion of the Engineer it shall be necessary to do so.

All masonry shown on this sheet shall be second-class concrete

For directions relating to modification of foundations see sheet # 17

All cross walls shall be well keyed into main walls by vertical keyways.

Top of lock walls to be crowned 2".

Top edges of all walls are to be rounded to a radius of 2" unless otherwise shown

Details and location of Electric Wire Conduits will be furnished later

Contract No. 67.

Erie Canal — Section 10

Locks and Canal at Lockport.

PLAN & ELEVATIONS OF LOCK 34

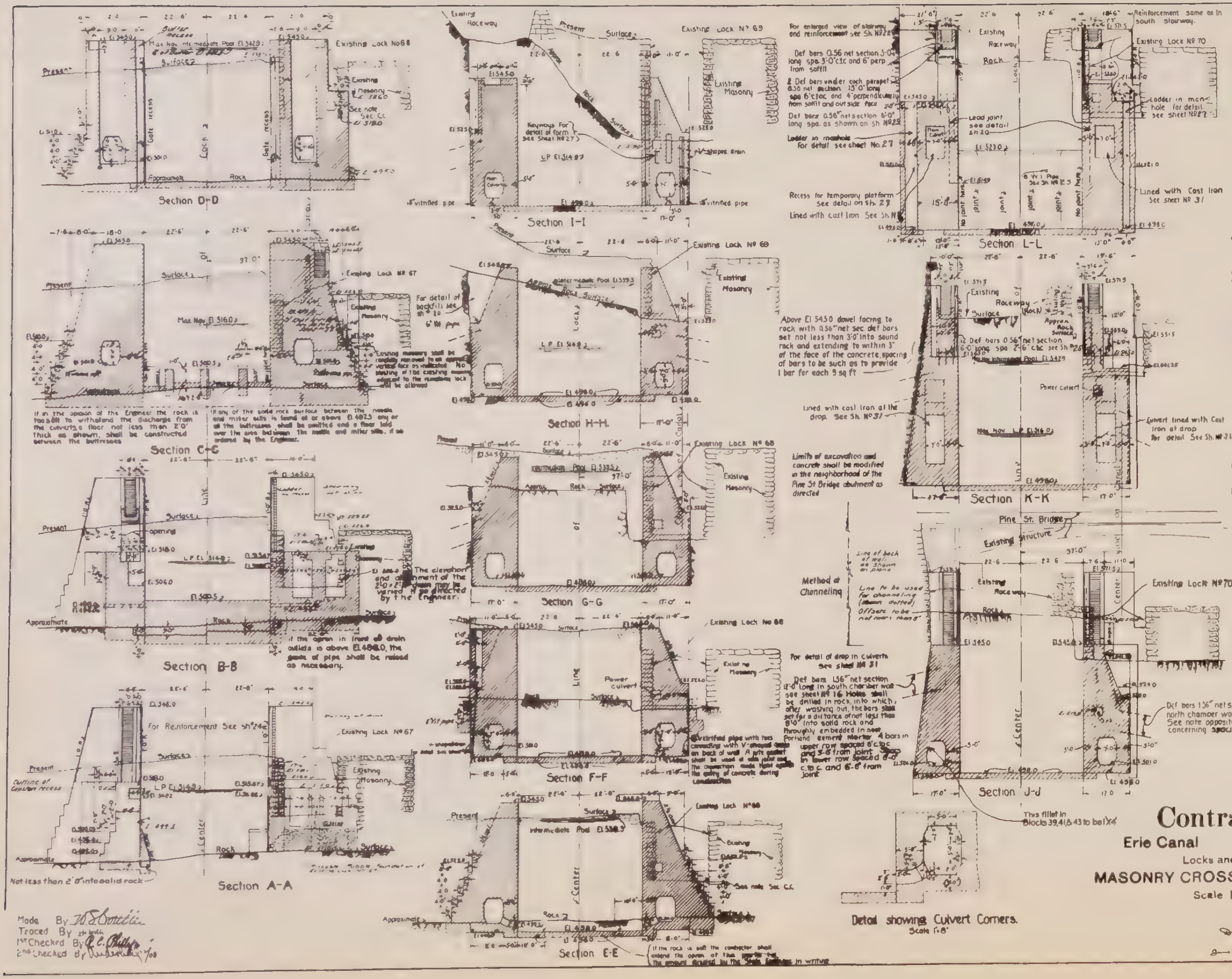
Scale 16 feet to the inch

Examined and approved

Wm B Landreth

June 23 1910

16



In case conditions met with during construction show that a modification, either as increase or decrease of reinforcing and anchor bars, shown on the plans either in number or location such modification shall be made as directed. This applies to all structures on this contract. All work connected therewith shall be paid for at corresponding contract prices.

All masonry shown on this sheet shall be second-class concrete.

The bases of any portion of structures shown on any of the plans of this contract shall be considered as approximate only, and may be ordered by the State Engineer in writing to be at any elevation and of any dimension necessary to give a proper foundation, and the outlines of the structures themselves shall be similarly modified as necessary or as directed in order to suit actual conditions found at time of construction. All work connected therewith shall be paid for at contract prices.

Structures shall rest upon the natural rock surface if it be suitable, or unless otherwise shown or directed. Full outlines show the probable minimum section. Dotted outlines show the estimated maximum section.

Rock faces against which masonry is to rest shall be channeled unless otherwise directed by the State Engineer.

During laying and until concrete has set, a 1" hose must be kept running full into each vertical drain so as to wash away any leakage of grout.

For additional notes see lock drawing, Sheet No 16

For additional sections showing power culvert see Sheet No.

Omit bottom step on back of walls where the height is less than the width.

Top of Lock walls to be crowned 3"

A dimension enclosed thus (5'0") shows the minimum allowable thickness of concrete at the point indicated.

Location and details of Electric Wire Conduit not shown and will be furnished.

See also detail of Pull Box sh# 32

Contract No. 67.

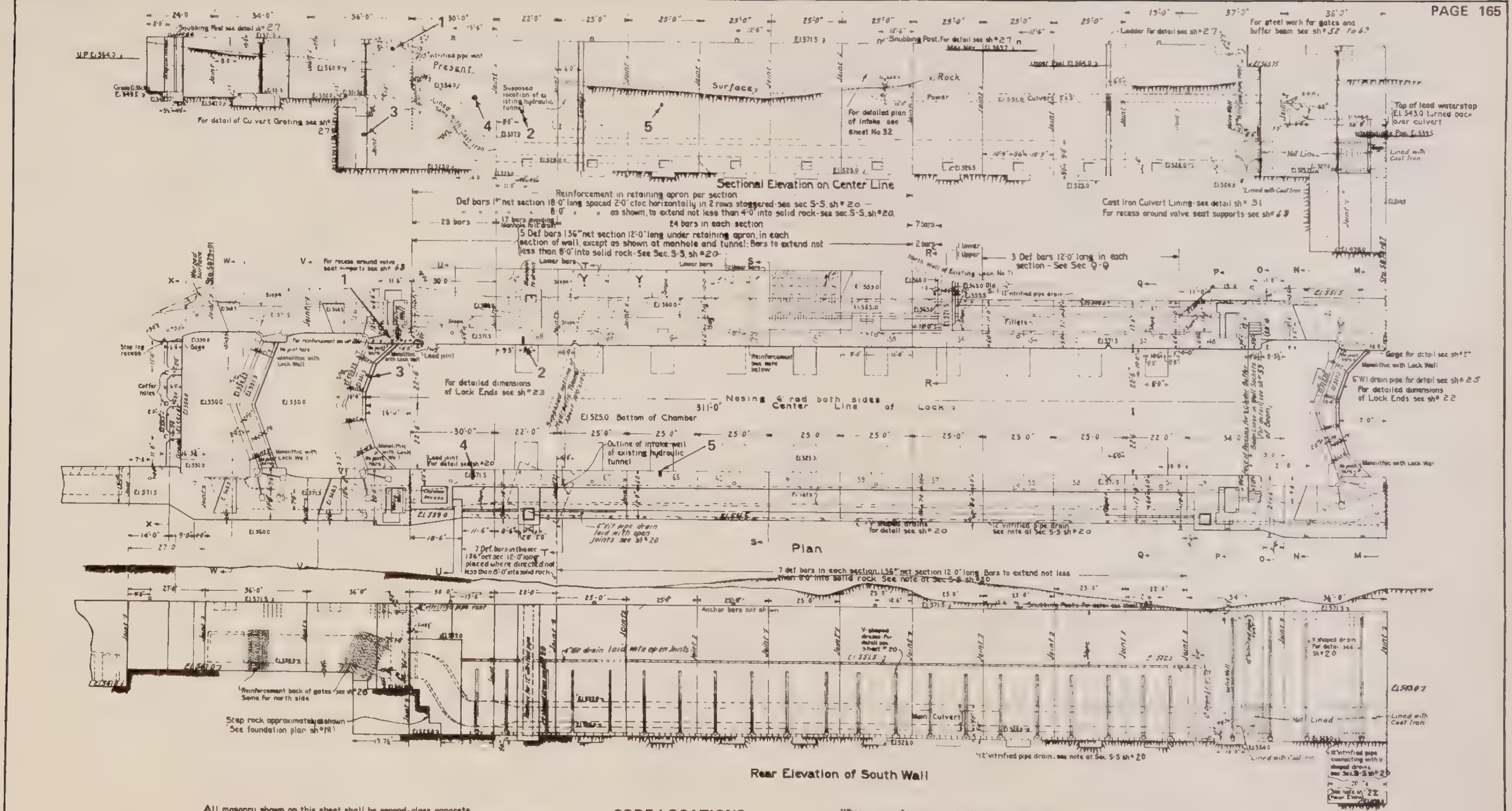
Erie Canal — Section 10

Locks and Canal at Lockport

MASONRY CROSS SECTIONS OF LOCK 34

Scale 16 feet to the inch

Made By
Traced By
1st Checked By
2nd Checked By



All masonry shown on this sheet shall be second-class concrete.
Top edges of all walls are to be rounded to a radius of 2" unless otherwise shown
All cross walls shall be well keyed into main walls by vertical keyways
Top of lock walls to be crowned ⅜".
For directions relating to modification of foundations see sheet °20
Figures enclosed thus (75) are index numbers indicating sections.
The uppermost six feet of sections No 46, 47, 72, 73, 74 and 75 shall be built as monoliths and work once begun thereon shall be continued without interruption until the section is completed.
Rock faces against which masonry is to rest are to be channeled unless otherwise directed by the State Engineer in writing.
If the rock is soft the contractor shall extend the floor aprons at the ports to the amount directed by the State Engineer in writing
Where springs or leakage is encountered additional drains are to be put in where directed by the Engineer.
All stations shown on this plan are center line stations.

CORE LOCATIONS

Whenever reinforcement is indicated back of snubbing posts, it shall consist of 2 def bars 0.56"net section 6-0" long spaced 5" c to c vertically, the upper bar 4" from the top of wall. Bend bars around back of snubbing posts as shown.
Details and location of Electric Wire Conduits will be furnished later

MADE BY [signature]
TRACED BY R.K. [signature] 1.15.'19
1st. CHECK BY [signature]
2nd. CHECK BY [signature]

Contract No. 67.

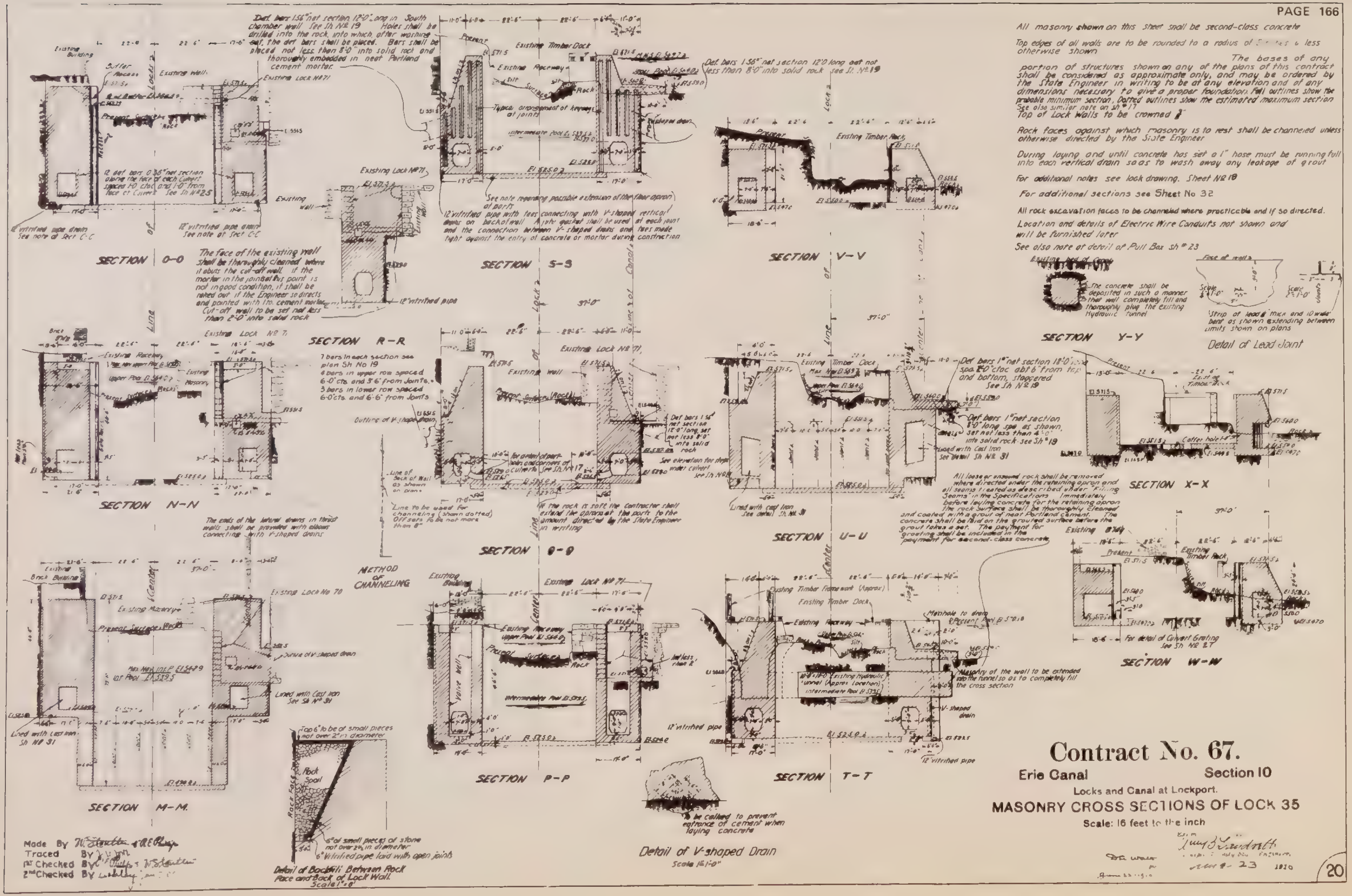
Erie Canal — Section 10

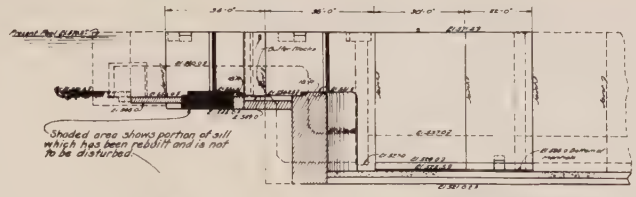
Locks and Canal at Lockport

PLAN & ELEVATIONS OF LOCK 35

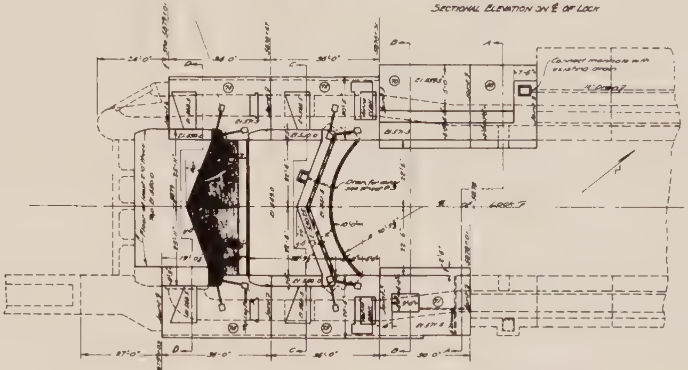
Scale 16 feet to the inch

Wm. B. Landreth [signature]
June 23 1920

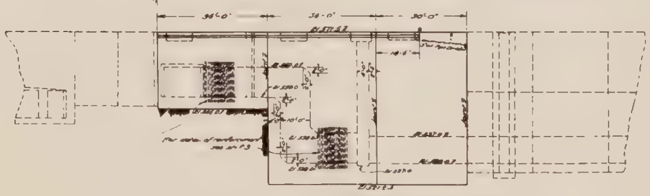

All masonry shown on this sheet shall be second-class concrete
Top edges of all walls are to be rounded to a radius of unless otherwise shown
The bases of any portion of structures shown on any of the plans of this contract shall be considered as approximate only, and may be ordered by the State Engineer in writing to be at any elevation and of any dimensions necessary to give a proper foundation. Full outlines show the probable minimum section, Dotted outlines show the estimated maximum section
See also similar note on sh # 17
Top of Lock Walls to be crowned
Rock faces against which masonry is to rest shall be channeled unless otherwise directed by the State Engineer
During laying and until concrete has set a 1" hose must be running full into each vertical drain so as to wash away any leakage of grout
For additional notes see lock drawing. Sheet No 18
For additional sections see Sheet No 32
All rock excavation faces to be channeled where practicable and if so directed.
Location and details of Electric Wire Conduits not shown and will be furnished later
See also note at detail of Pull Box sh # 23
SECTION O-O
SECTION S-S
SECTION V-V
SECTION R-R
SECTION Y-Y
Detail of Lead Joint
SECTION N-N
SECTION Q-Q
SECTION U-U
SECTION X-X
METHOD OF CHANNELING
SECTION M-M
SECTION P-P
SECTION T-T
SECTION W-W
Detail of V-shaped Drain
Scale 1'=1'-0"
Detail of Backfill Between Rock Face and Back of Lock Wall.
Made By
Traced By
1st Checked By
2nd Checked By
Contract No. 67.
Erie Canal
Section 10
Locks and Canal at Lockport.
MASONRY CROSS SECTIONS OF LOCK 35
Scale: 16 feet to the inch
1910
20



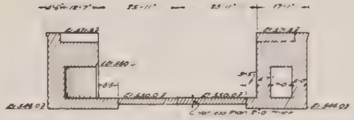
SECTIONAL ELEVATION ON ℄ OF LOCK



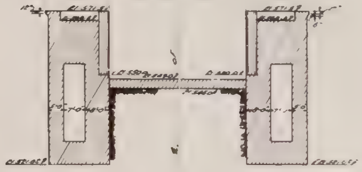
PLAN OF UPPER END - LOCK #35



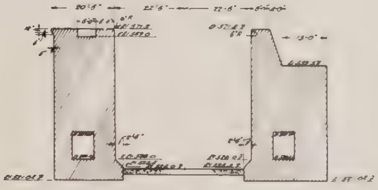
REAR ELEVATION OF SOUTH WALL



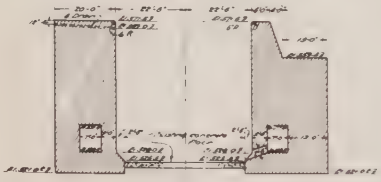
D-D



C-C



B-B



A-A

NOTES

Solid lines indicate lines of new construction or portion of lock to be rebuilt
Dotted lines show existing structure
All masonry shown on this sheet shall be second-class concrete
All exposed edges of concrete shall be rounded to a radius of 2" unless otherwise shown.
The elevation of the bases of structures shown on this sheet are approximate only and shall be placed at the elevation determined by the Engineer.
Replace concrete lock floor where directed by the Engineer.
Lock gates, valves and equipment are not shown on this sheet
For details of controller platforms, conduits etc. see sh # 5 & 6
For an cross detail plan see sheet # 3
For sections see sheet # 4
Slope top of lock wall ½" for drainage.
The Contractor shall use great care in excavating adjacent to the portions of the lock which are not to be rebuilt. All damage to such masonry shall be repaired at the Contractor's expense.

Made by
Checked by
Traced by
Eng Check by

SEE CHANGES
PAGE 169

Contract No. 152

REBUILDING UPPER END OF LOCK 35

Erie Canal Section 10

PLAN, ELEVATION AND CROSS SECTIONS
OF PORTION OF LOCK TO BE REBUILT

Scales as indicated

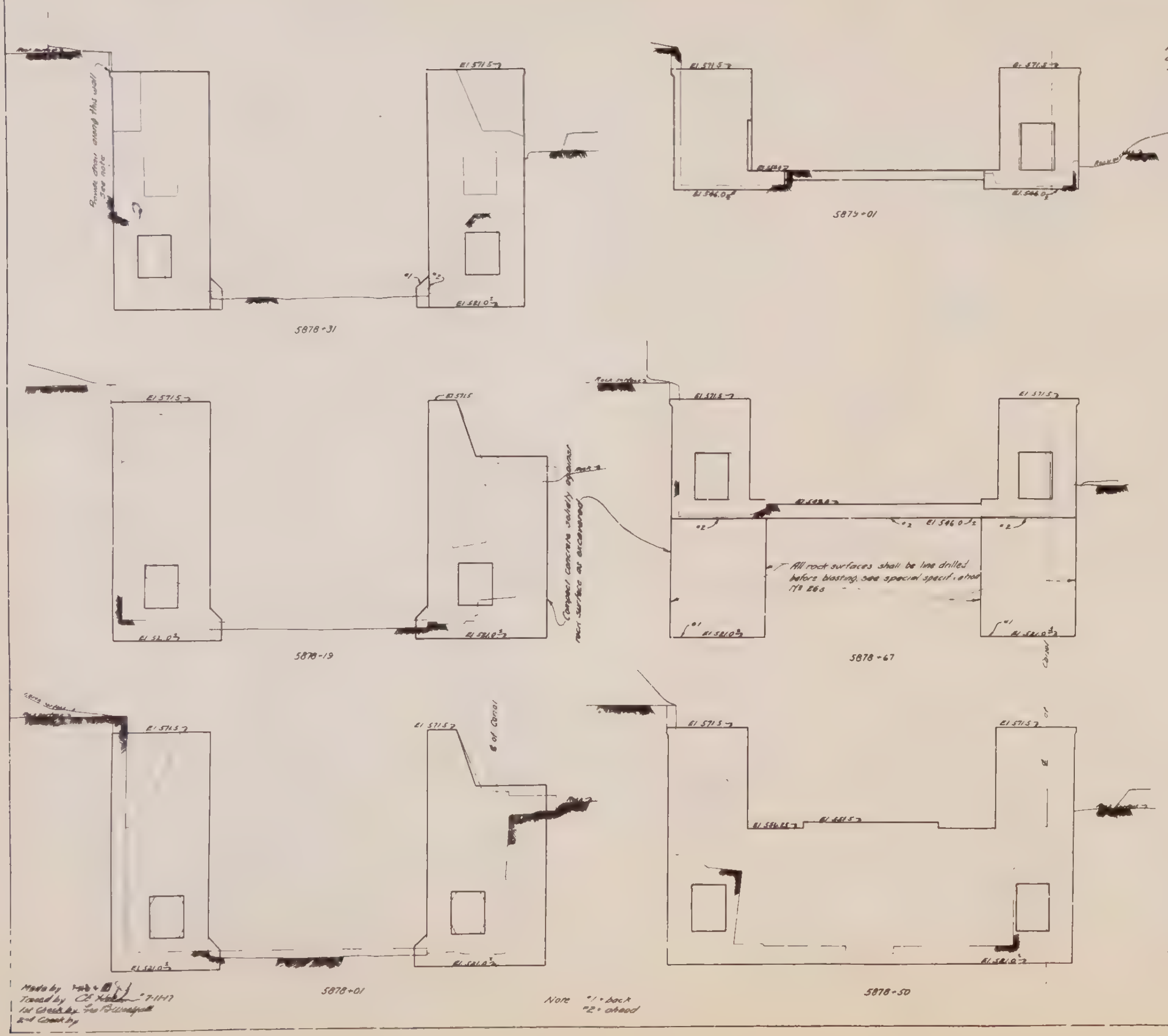
Examined and approved
July 27 1917
Division Engineer

July 30 1917
Special Deputy State Engineer.

2

NOTES.

Light lines represent outline of present concrete structure
Heavy lines represent outlines of new structure
All rock surfaces against which concrete is to be placed shall be freed from loose pieces, cut to firm surfaces and cleaned just before concrete is placed. As concrete is placed it shall be thoroughly compacted against and bonded with the rock surface
Under walls, rock surfaces sloping more than 1 on 20 shall in general be stepped level
Provide a concrete lined open drain along back of south wall to connect with 6" drain through wall at Sta. 5878+06. Details to be furnished by the Engineer. Payment for drain will be made at the contract prices for the various items involved.



Contract No. 152

REBUILDING UPPER END OF LOCK 35

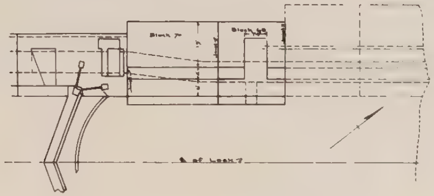
Erie Canal — Section 10

CROSS SECTIONS SHOWING PRESENT AND PROPOSED LOCK MASONRY

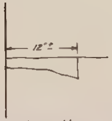
Scale One Inch Equals Ten Feet

Examined and approved
July 27 1917
F. Williams
Division Engineer.

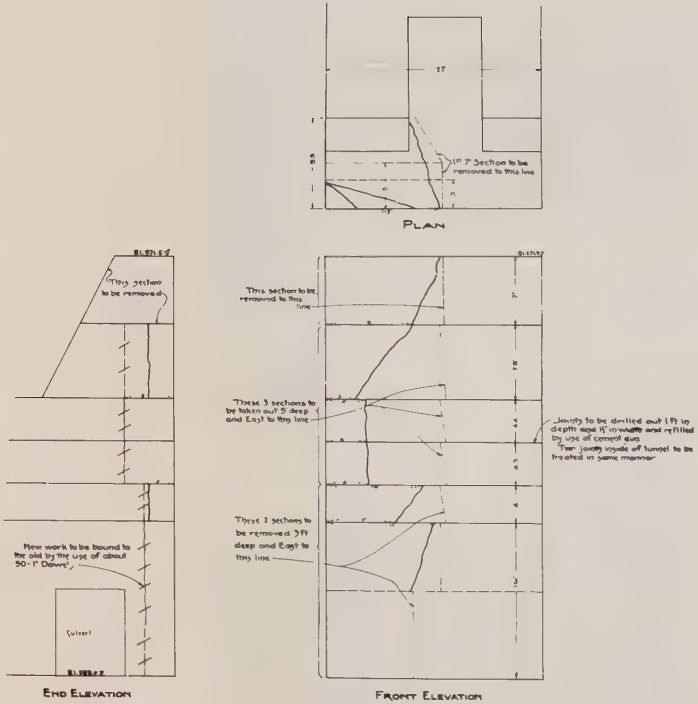
Examined and approved
July 1917
Special Deputy State Engineer.



PLAN OF UPPER END OF LOCK No. 35
SHOWING BLOCK No 68 AS INTENDED TO BE REBUILT
UNDER CONTRACT No 152



All cracks in old concrete which will be exposed when repairs on section are completed shall be chiseled out as shown and filled with grout in accordance with the instructions of the Engineer



DETAILS OF ORIGINAL BLOCK No 68 SHOWING PROPOSED REPAIRS

NOTE: Anchor bolts shall be grouted in holes in existing masonry as provided in specification No. 215
This plan is intended to require and include all work and material necessary and proper to repair Block No 68 in a substantial and workmanlike manner, satisfactory to the Engineer

Contract No. 152

ALTERATION NO 1

Erie Canal — Section 10

PLAN AND SECTIONS SHOWING REPAIRS TO BLOCK NO. 68

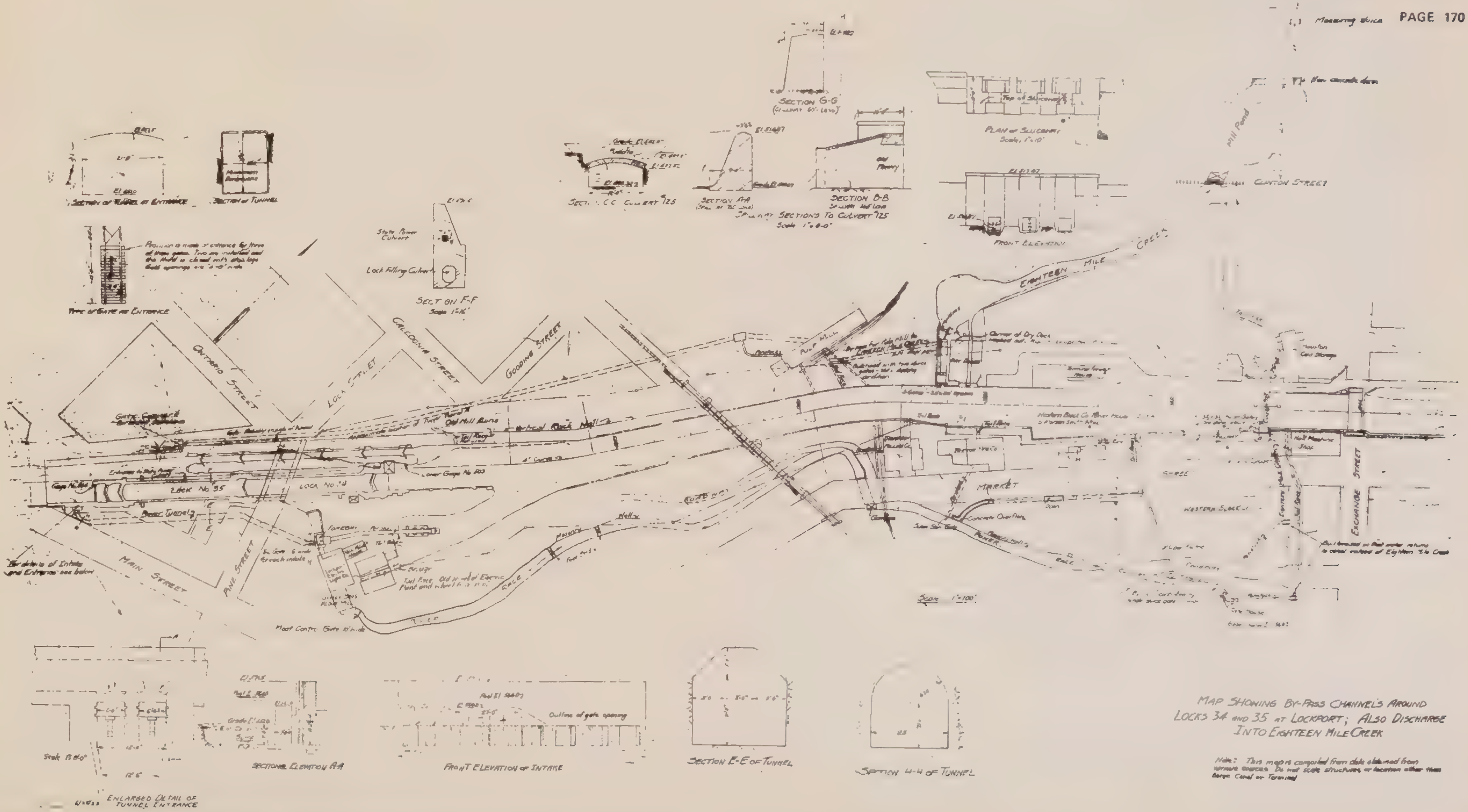
Scales as indicated

Examined and approved
April 1, 1920
L. C. Hulburd
Division Engineer

Examined and approved
1920
Special Deputy State Engineer

Made by
Traced by
Checked by

10


MAP SHOWING BY-PASS CHANNELS AROUND
LOCKS 34 AND 35 AT LOCKPORT; ALSO DISCHARGE
INTO EIGHTEEN MILE CREEK
Note: This map is compiled from data obtained from various sources. Do not scale structures or location other than Barge Canal or Terminal
ENLARGED DETAIL OF TUNNEL ENTRANCE
SECTIONAL ELEVATION A-A
FRONT ELEVATION OF INTAKE
SECTION E-E OF TUNNEL
SECTION 4-4 OF TUNNEL
SECTION OF TUNNEL AT ENTRANCE
SECTION OF TUNNEL
TYPE OF GATE AT ENTRANCE
SECT ON F-F
Lock Filling Culvert
State Power Culvert
SECT. C C CULVERT 125
SECTION A-A
SECTION B-B
SECTION G-G
SECTIONS TO CULVERT 125
PLAN OF SLUICEWAY
FRONT ELEVATION
CLINTON STREET
Mill Pond
Measuring device
ONTARIO STREET
LOCK STREET
CALEDONIA STREET
GOODING STREET
MAIN STREET
PINE STREET
EXCHANGE STREET
LOCK No 35
LOCK No 34
EIGHTEEN MILE CREEK
PULP MILL
MARKET
POWER RACE
Concrete Overflow
Float Control Gate
Scale 1"=100'

Brockville Quarry Wall
Located at toe of north embankment between
Brockville Weir and State Route 387

Looking South Across Flooded Quarry
Concrete retaining wall is on far side of quarry.

West End of Quarry Wall
Due to a number of leaks into the quarry, this wall was constructed when the Barge Canal was built.

East End of Quarry Wall
The wall was inspected in the Winter 1976 when the canal was empty. No cores were taken. Quarry depth is not known.

Center of Quarry Wall
Although the wall surface contained a number of efflorescent covered cracks, the concrete appeared to be in generally good condition.

Except for the 12.5 mile section between Lock 32 and South Greece, construction of the Barge Canal between Fairport and Lockport (73.5 miles) included the widening and deepening of the enlarged Erie Canal. Throughout most of the remaining 61 mile section, the Barge Canal resembles a large ditch slightly elevated above the land. One of the main reasons for this type of construction, as opposed to a ditch depressed into the landscape, is the need to maintain the natural drainage patterns of the land. A ditch would cut off most of the small streams and deprive downstream areas of water. Also, all these streams feeding into the canal with their highly variable flow, would create numerous problems in controlling the canal water level. Therefore, nearly all the streams in this area pass under the canal in culverts or dive culverts (culverts which drop down on one side of the canal, pass underneath, and then come up on the other side).

Of the 97 culverts between Fairport and Lockport, 14 stone block arches (limestone) date back to the 1825 and 1862 Erie Canals, 81 cast-iron-pipes, concrete arches or concrete boxes were installed between 1909 and 1917 during Barge Canal construction, and two concrete pipes were placed since 1966. Various extensions were added to more than one third of these culverts due to embankment widening, highway construction and other reasons.

STONE BLOCK ARCH CULVERTS

When the 1825 Erie Canal stone block arch culverts were extended for the 1862 Erie Canal, the same type stone was used. Therefore, the extensions are no longer detectable. This was discovered in 1975 when a stone block arch culvert was partially uncovered and the 1825 culvert headwall was found buried in the embankment. Records do exist for this construction, but we assume that all the stone block arch culverts, except the indistinguishable extensions, date back to the original 1825 Erie Canal.

Although these arch culverts are over 150 years old, they are still in fair to good condition. The major problems noted were isolated stone block slippage, fractures, fractures along stone block bedding planes and leakage.

Most of the slippage appears to have occurred long ago, possibly soon after construction. Since the stone blocks are wedge shaped, they can slip down only a few inches if the joint material fails. Fracturing has caused some of the 1-foot wide by 2-foot deep by 3-foot long stone blocks to partially fall out, leaving cavities in the walls or ceiling. Leakage has been generally minor, causing discoloration and efflorescence. However, some locations have water spouting out under pressure.

High pressure leaks through any culvert are a cause for concern as this means there is a direct path between the leak and the canal. Any failure of this type could cause immediate serious problems. Some very slow leaks, however, have continued since original construction and will probably never cause any problems. What should be watched is any change in leak size or color and whether the water is carrying fine sediment. The slow washing out of embankment soil over the years will cause embankment settlement, or in the case of an overhead structure, possible sudden collapse.

Normally, slow leaks cause no problems, except in the case of one unique culvert. Culvert #96 is the only one that has a road, known as Culvert Road, passing through it. When extended for the Barge Canal, this culvert was the only one lengthened with stone blocks (Medina sandstone) instead of concrete. The 19-foot wide by 11-foot high stone arch culvert has a number of constant drips. During the winter months, this dripping causes ice buildup on the culvert floor and overhead ice masses. Many attempts have been made to try to cut off all leakage,but none have completely succeeded. In August of 1976, heavy leaks suddenly occurred and a contract to stop all leaks will be completed in the Spring of 1977.

WIDEWATER CULVERTS

During culvert inspections in 1975, three cast-iron-pipe culverts (#51, 68 and 90) were found to apparently have entrances under the only three large widewater areas (Spencerport, Holley and Knowlesville) between Rochester and Lockport. All were built as part of the Barge Canal to replace existing culverts under the enlarged Erie Canal. How a culvert could have an entrance under water and not drain any was discovered when Culvert #68 (the only one not half full of water) was crawled through from the exit or north end. The south end, a short distance in from the original entrance, contained a wooden plug. Behind this plug has to be concrete completely filling the entrance area. Thus, all three culverts were plugged prior to flooding the widewater areas.

In the Spring of 1976, an attempt was made to locate the entrances of these widewater culverts when the canal was drained, but all were found to be buried under ten feet or more of mud. The most unusual thing noted at this time was that all three wide water area south embankments, except for the widewater entrances, were lined with steel sheet piling.

Partial answers to all this were finally found in two Superintendent of Public Works Reports. In the 1928 Report,

> "A sloughing of the upper slope of the canal bank west of Holley occurred just after the close of navigation in 1927. The pool was lowered, relieving the pressure against the bank, and early this year a line of steel sheet piling was driven through the affected area. The bank was restored and reinforced with heavy material along the outer toe and slope."

In the 1933 Report,

> "There was no wet spoil area on the Sixty Mile Level of the Erie Canal, west of Rochester, making it necessary to rehandle all dredged material. Studies of the topography indicated the possibility of using a basin on the south side of the canal, west of Holley, where 18.34 acres of land lying below the canal were purchased. Cutting through the canal bank and flooding this area has provided a wet spoil of 225,000 cubic yards capacity."

What apparently happened at these three widewater areas is as follows:

1. Culverts built to replace old Erie Canal culverts.
2. South embankment in area of culverts began to fail.
3. Sheet piling driven to hold embankment areas.
4. Embankments continued to slowly fail.
5. Low land purchased, culverts plugged, section of embankment removed and areas flooded.

This solved two problems; the failing embankments and the acquisition of three needed wet spoil areas. Although Culverts #51 and 68 have center drains leading to the overhead canal, the three culverts presently serve no purpose.

BARGE CANAL CULVERTS

Most of the smaller culverts installed during the building of the Barge Canal were cast-iron-pipes encased in one foot of concrete. These one inch thick pipes are still in generally good condition with only some light internal rust and minor joint leakage.

A few of the cast-iron-pipe culverts also have concrete arch extensions even though they have not been lengthened since original construction. What happened is that Barge Canal construction called for lengthening the stone block arch culverts under the enlarged Erie Canal with concrete arches. Due to joint leakage and failures between these two arch sections, the decision was made to remove the stone block arch sections and replace them with cast-iron-pipes. Thus, these culverts appear to have been extended.

The rest of the smaller culverts were either concrete arches or concrete boxes, but there were also a few large concrete box culverts. All the extensions constructed at this time, and later extensions, were also made of concrete.

The largest culvert on the canal system is known as the Medina Aqueduct. This 50-foot wide by 17-foot high culvert, which carries Oak Orchard Creek under the 30-40 foot high wall section at Medina, is a rigid frame, steel arch encased in concrete. It is actually an arch bridge with high side walls for carrying water.

CULVERT PROBLEMS

Problems associated with the concrete culverts and extensions are confined mainly to deterioration caused by the freezing and thawing of water in the concrete. Headwall areas have generally suffered the most damage, but many are still in fair to good condition. Several also have scattered scale areas within the culverts where deep depressions exist. Two culverts had holes of approximately one square foot in area through the tops of the arch where gravel was washing in. Fortunately, these holes were near the ends of the culverts and not under the canal. Although nearly all the joints in the concrete culverts leak, joint deterioration varies from none to extensive in a few culverts.

Overall, most culverts are still in good condition. Although repairs are needed in many, the majority of these repairs are limited to small areas. The most extensive repairs are needed on the few old, stone block arch culverts. General observed conditions which hinder the functioning and maintenance of the culverts include:

1. Exit channels were filled (or silted in) which caused culverts fo fill up.
2. Extensive vegetation was present at entrances and exits which hinder any inspection.
3. Trees and shrubs growing over entrances and exits have tilted headwalls, and roots have forced cracks to open further.
4. Internal debris has clogged culverts. This has caused the water to back up and seek other paths under the canal, or blow up into the canal through loose drain covers or cracks.
5. Rocks and trash have collected in entrance and exit wells of dive culverts.
6. Culverts with low velocity water have slowly silted up over the years.
7. Present repair and cleaning is now much more extensive than if it had periodically been done in the past.
8. Past repairs were generally made after problems occurred.
9. Culvert exits on the north side of canal are generally easily accessible (for inspection) from the towpath. However, no convenient way exists to inspect the majority of culvert entrances. Some even require crossing private property.

REDISCOVERED CULVERTS

While inspecting Culvert #59 in 1975, two culverts were found 40 feet apart inside a newly constructed common exit. After some research, it was found that Culvert #59 (twin 42-inch cast-iron-pipes) was built in 1910. The lower half of Culvert #59½ (a 48 inch concrete pipe) contains an 18 inch concrete sewer pipe encased in concrete. Culvert #59½ was installed by the Village of Brockport in 1966 by Permit #66-1-9.

Due to the possibility of other "lost" culverts existing under the canal, all old Barge Canal contracts and other plans were reviewed. Culvert #124 was relocated with the finding of Superintendent of Public Works plans dated 1917. Found in Contract 162 was a 16-inch cast-iron-pipe drain placed under the canal in 1917 next to the Main Street Bridge in Brockport. This culvert is now called #58½.

The existence of Culvert #30½ in the Irondequoit Creek embankment was unknown. However, research has verified that this long abandoned culvert does exits. (See History - Barge Canal Construction - Bushnell Basin to Cartersville.)

Also examined were all the canal permits on file with the Waterways Maintenance Subdivision in Albany. These permits, which grant municipalities and others the right to use or place pipelines across canal land, date from the original Erie Canal to the present. A few recorded old permits could not be found. However, the sparseness and irregular dates of older permits (prior to 1900) leads one to believe that many permits no longer exist.

Most of the permits were for gas, water and sewer lines under the canal. However, Permit #1933-12-312 granted the right to construct an 18-inch sewer south of the canal and to connect with an existing sewer crossing at Medina. A check of the permit revealed that this sewer connected to a large 4-foot by 5-foot arch sewer under the canal at Glenwood Avenue. Two other older permits (1913-12-260 and 1907-3-10) also granted rights to relocate and place sewers on the south side of the canal to connect with this existing sewer crossing.

A check of Barge Canal Contract 65, under which the Barge Canal was constructed at Medina from 1913-1915, revealed no sewer or culvert work in the Glenwood Avenue area. Since the 1913 and 1907 permits allowed the Town of Medina to relocate sewer lines in anticipation of the Barge Canal, and no work was done by the State, the existing sewer crossing was already down deep enough to not be disturbed by the new Barge Canal. However, an old Contract 65 photograph showed the top of the culvert uncovered in a shallow trench and the contractor placing concrete over it. No permit could be found for this sewer crossing.

Therefore, it must be assumed that this 4-foot by 5-foot high by 500-foot long stone block arch culvert or sewer was most probably built at the time of the first Erie Canal in 1825. It is now called Culvert #99½.

On February 18, 1976, Mr. Wayne Ward, Town of Medina Department of Public Works Supervisor, was contacted. He was aware of the combined storm and sanitary sewer and had been down one of the brick manhole entrances. However, to his knowledge, no one had ever completely inspected it. On September 2, 1976, in another meeting with Mr. Ward, the potential dangers of inspecting this culvert were discussed. At the upstream manhole (south side of canal), sewer water cascades from an upper level to a much lower level and then passes under the canal in a 6-12 inch deep stream. Therefore, one would have to enter at the downstream manhole and travel upstream 500 feet to the base of the waterfall and back again. Inhaled raw sewage mist and the possibility of someone in Town dumping gasoline or other dangerous substances into the sewer at the time of inspection requires that a self-contained breathing apparatus be used for this inspection. Mr. Ward believed that the local fire department would supply the required equipment.

Although culverts #59½ (Brockport) and #99½ (Medina) are not owned by the State, responsibility for their inspection may have to rest with the State due to the consequences of any failures.

CULVERT ABBREVIATIONS USED

2-36" C.I.P.	=	two, 36 inch diameter, cast iron pipe culverts
10'-2" x 7'	=	10 feet, 2 inch wide by 7 feet high culvert
Conc. Pipe	=	concrete pipe culvert (recently installed)
Box	=	rectangular shaped culvert
Arch	=	upside down, U shaped culvert
Dive	=	A culvert that slopes down or drops vertically at the entrance, passes under the canal and then slopes up or rises vertically at the exit. Therefore, it is always filled with water.
Br.	=	Creek Branch

REGION 4 CULVERTS

No.	Station	Barrels	Size	Type	Length	Stream	Comments
26 Dive	1803+00	5	48"	C.I.P.	192.5'	White Brook	Not Inspected
27 Dive	1938+93	1	30"	C.I.P.	197'	Irondequoit Creek Br.	Not Inspected
28	1994+35	2	36"	C.I.P.	213'	Irondequoit Creek Br.	Good Condition
29	2064+80	1	84"	Conc. Pipe	333'	Irondequoit Creek Br.	Good Condition (New 1975)
30	2115+20	2	12' x 9'	Conc. Box	508'	Irondequoit Creek	Good Condition Isolated Deterioration
30½	2124+15	1	2' x 2' 6"	598' Conc. Box 116' C.I.P.	714' Skewed	None	Not Inspected Buried in Embankment
31 Dive	2202+35	1	42"	C.I.P.	192.5' + 135' Ext.	Irondequoit Creek Br.	Not Inspected
33 Dive	2276+60	1	8' x 8'	Conc. Box	185' + 75' R.R. Ext.	Allen Creek Br.	Not Inspected
34 Dive	2300+16	1	42"	C.I.P.	304'	Allen Creek Br.	Not Inspected
2300+81.5 BACK = 2143+00 AHEAD							
35	2253+55	2	8' x 6'	Conc. Box	401' Skewed	Allen Creek	Repairs Needed
43 Dive	2743+70	1	4' x 3'3"	Conc. Arch	189' + 235' Ext.	Round Pond Creek Br.	Not Inspected
44	3044+75	1	42" 4' x 3'	132' C.I.P. 72.5' Conc. Arch	204.5'	Round Pond Creek Br.	Repairs Needed. 36' of Corr. Metal Pipe Recently Installed.
45	3072+50	1	48" 4' x 4'	132' C.I.P. 74' Conc. Arch	206'	Round Pond Creek	Repairs Needed
46	3182+85	1	5.5' x 4'	Conc. Arch	206.5'	Larkin Creek	Not Inspected
47	3281+12	1	8' x 7'	Conc. Arch	220.5'	Northrup Creek	Future Repairs Needed
48 Dive	3305+85	1	36"	C.I.P.	216'	Black Creek	Not Inspected. Not Originally built as dive culvert.
49	3325+18	1	42" 4' x 3'	136.5' C.I.P. 102.5' Conc. Arch	239'	Buttonwood Creek	Repairs Needed
50	3348+00	1	42" 4' x 3'	148.5' C.I.P. 73' Conc. Arch	221.5'	Buttonwood Creek Br.	Future Repairs Needed
51	3362+15	1	42" 4' x 3'	136.5' C.I.P. 82' Conc. Arch	218.5	Buttonwood Creek Br.	Not Inspected. South end plugged.
52	3430+70	1	4' x 4'	Conc. Box	210.5'	Salmon Creek Br.	Not Inspected

REGION 4 CULVERTS

No.	Station	Barrels	Size	Type	Length	Stream	Comments
53	3440+00	2	2@ 42" 6' x 3.5'	172.5' C.I.P. 165.5' Conc. Arch	338'	Salmon Creek Br.	Repairs Needed
54	3453+53	2	12' x 6'7"	124' Stone Arch 78' Conc. Arch	202'	Salmon Creek	Repairs Needed
55 Dive	3522+00	1	8' x 5'	Conc. Arch	197'	Salmon Creek Br.	Not Inspected
55½ Dive	3567+78	1	2' x 1.5'	Conc. Box	235'	Otis Creek Br.	Not Inspected
56 Dive	3592+33	2	2@ 48" 7.5' x 5' 12' x 8'	130' C.I.P. 90' Conc. Arch 11' Conc. Slab	231'	Otis Creek	Not Inspected
57	3632+87	1	4' x 4.5'	151.5' Stone Arch 80' Conc. Arch	231.5	Brockport Creek	Repairs Needed
58 Dive	3671+84	1	48" 3.5' x 4.5'	144.5' C.I.P. 78.5' Conc. Arch	223'	Brockport Creek Br.	Not Inspected
58½	3689+71	1	16"	C.I.P.	145'	Brockport Creek Br.	Not Inspected
59	3710+26	2	2@ 42" 8' x 4'	180' C.I.P. 22' Conc. Box	202' + Ext.	Brockport Creek Br.	Good Condition. Extends ½ mile to College Campus.
59½	3710+68	1	½ - 48" 36"	165' Conc. Pipe 35' C.I.P.	200' Connects to Culvert #59	Brockport Creek Br.	Fair condition. 18" sewer encased in bottom half.
60	3758+12	1	48"	C.I.P.	213'	Moorman Creek Br.	Minor repair needed.
61 Dive	3803+82	1	5.5' x 4'3"	Conc. Arch	204.5'	Moorman Creek	Not Inspected
62 Dive	3830+35	1	4' x 4'	Conc. Arch	203'	W. Fork Moorman Creek Br.	Not Inspected
63 ½ Dive	3856+82	1	60"	C.I.P.	197.5'	W. Fork Moorman Creek	Not Inspected
64 Dive	3887+12	1	42"	C.I.P.	187'	E. Br. Sandy Creek Br.	Not Inspected
65	3915+65	1	12' x 11'1"	364' Stone Arch 156' Conc. Arch	520'	E. Br. Sandy Creek	Fair to Good condition
66	3943+93	1	42"	C.I.P.	207'	E. Br. Sandy Creek Br.	Not Inspected
67	3978+04	1	48"	C.I.P.	231'	E. Br. Sandy Creek Br.	Good Condition
68	3998+40	1	42"	C.I.P.	240'	E. Br. Sandy Creek Br.	Good Condition. South end plugged.

REGION 4 CULVERTS

No.	Station	Barrels	Size	Type	Length	Stream	Comments
69 Dive	4073+13	1	5' x 4'	Conc. Box	204'	W. Br. Sandy Creek Br.	Not Inspected. Embankment leaks.
70 Dive	4106+98	1	3'9" x 3'9"	Conc. Box	178'	W. Br. Sandy Creek Br.	Not Inspected
71 Dive	4151+75	3	7'8" x 4'	Conc. Box	179'	W. Br. Sandy Creek Br.	Not Inspected
72 Dive	4205+53	2	42"	C.I.P.	194'	W. Br. Sandy Creek Br.	Not Inspected
73 Dive	4273+52	1	3'9" x 3'9"	Conc. Box	203.5'	W. Br. Sandy Creek Br.	Not Inspected
73½ Double Dive	4290+73	1	36"	C.I.P.	183'	W. Br. Sandy Creek Br.	Not Inspected
74 Dive	4313+68	1	3'9" x 3'9"	Conc. Box	205'	W. Br. Sandy Creek Br.	Not Inspected
75 Dive	4361+81	1	24"	C.I.P.	204'	W. Br. Sandy Creek Br.	Not Inspected
76 ½ Dive	4380+49	1	42"	C.I.P.	217'	W. Br. Sandy Creek Br.	Not Inspected
77	4411+32	2	12' x 6'3"	135.5' Stone Arch 40.5' Conc. Arch	176	W. Br. Sandy Creek	Repairs Needed
78 Dive	4418+11	1	42"	C.I.P.	216'	W. Br. Sandy Creek Br.	Not Inspected
79 Dive	4439+20	1	30"	C.I.P.	144'	Marsh Creek Br.	Not Inspected
80 Dive	4448+72	1	42"	C.I.P.	190'	Marsh Creek Br.	Not Inspected
82 Dive	4478+40	1	60"	C.I.P.	195.5'	Marsh Creek Br.	Not Inspected
83 Dive	4494+70	1	42"	C.I.P.	243'	Marsh Creek	Not Inspected
84 Dive	4514+12	1	42"	C.I.P.	207'	Marsh Creek Br.	Not Inspected
85 Dive	4554+60	1	42"	C.I.P.	195'	Beardsley Creek	Not Inspected
86	4587+55	1	10.5' x 7'9"	300.5' Stone Arch 24' Conc. Arch 25'± Conc. Box	350'±	Otter Creek	Fair to Good condition
87 Dive	4603+23	1	30"	C.I.P.	182'	Otter Creek Br.	Not Inspected
88 Dive	4619+35	1	48"	C.I.P.	221.5'	Otter Creek Br.	Not Inspected
89	4642+68	1	30"	C.I.P.	222.5'	Oak Orchard Creek Br.	Not Inspected
90	4692+10	1	48"	C.I.P.	217.5'	Oak Orchard Creek Br.	Not Inspected. South end plugged.

REGION 4 CULVERTS

No.	Station	Barrels	Size	Type	Length	Stream	Comments
91 Dive	4741+85	1	30"	C.I.P.	182.5'	Oak Orchard Creek Br.	Not Inspected
92	4773+18	2	7.5' x 3'7" 2@ 42" 6' x 4' 4' x 3.5' 4' x 3.5'±	96' Conc. Arch 191' C.I.P. 58' Conc. Arch 150'± Conc. Box 30'± Planked over Stone Walls	525'±	Oak Orchard Creek Br.	Not Inspected
93 Dive	4779+05	1	36"	C.I.P.	182'	Oak Orchard Creek Br.	Not Inspected
94 Dive	4824+20	1	36"	C.I.P.	181.5'	Oak Orchard Creek Br.	Not Inspected
95	4850+58	2	10'2" x 7'	176' Stone Arch 30' Conc. Arch	206'	Fish Creek	Repairs Needed
96	4856+55	1	19' x 11'±	Stone Arch	202'	Culvert for Vehicles	To be Repaired in 1977
97 Dive	4896+75	2	36"	C.I.P.	181.5'	Oak Orchard Creek Br.	Not Inspected
98 Dive	4918+40	1	48"	C.I.P.	221.5' Skewed	Oak Orchard Creek Br.	Not Inspected
99	4987+16	1	50' x 17'	Conc. Arch	159'	Oak Orchard Creek	Repairs Needed
99½	5008+90±	1	4' x 5'	Stone Arch	500'±	Medina Sewer	Not Inspected
100 Dive	5038+18	2	42"	C.I.P.	185'	Oak Orchard Creek Br.	Not Inspected
101	5067+83	2	42"	C.I.P.	204.5'	Jeddo Creek Br.	Not Inspected
102	5109+83	1	36"	C.I.P.	196'	Jeddo Creek Br.	Not Inspected
103	5130+09	1	12' x 10'	174' Stone Arch 59' Conc. Arch	233'	Jeddo Creek	Repairs Needed

REGION 5 CULVERTS

No.	Station	Barrels	Size	Type	Length	Stream	Comments
104	5220+57	1	36"	C.I.P.	214'	Jeddo Creek Br.	Good Condition
105 Dive	5244+18	1	30"	C.I.P.	180'	Jeddo Creek Br.	Not Inspected
107	5259+42	2	12' x 5'	Stone Arch	147'	Jeddo Creek Br.	Poor condition. Repairs underway.
108 Dive	5285+48	1	42"	C.I.P.	197.5'	Johnson Creek Br.	Not Inspected
109	5340+80	1	9' x 7'	Stone Arch	231'	Johnson Creek	Repairs Needed

REGION 5 CULVERTS

No.	Station	Barrels	Size	Type	Length	Stream	Comments
110	5410+40	1	48" 4' x 4'	197' C.I.P. 20.5' Conc. Arch	217.5	Johnson Creek Br.	Good condition. Headwall repairs needed.
111	5436+80	1	48" 4' x 4'	188' C.I.P. 20.5' Conc. Arch	208.5'	E. Br. 18 Mile Creek Br.	Good condition
112 Dive	5454+24	1	36"	C.I.P.	207.5'	E. Br. 18 Mile Creek Br.	Not Inspected
113	5485+40	1	18' x 10'	190' Stone Arch 30' Conc. Arch	220'	E. Br. 18 Mile Creek	Good condition. Lined with corrugated metal.
114 Dive	5516+87	1	30"	C.I.P.	185.5'	E. Br. 18 Mile Creek Br.	Not Inspected
115	5536+80	1	4' x 4'	Conc. Box	245.5'	E. Br. 18 Mile Creek Br.	Good condition
115½	5556+98	1	24"	C.I.P.	231.5'	E. Br. 18 Mile Creek Br.	Good condition
116 Dive	5614+00	1	4' x 3'	Conc. Arch	191'	E. Br. 18 Mile Creek Br.	Not Inspected
117 Dive	5627+12	1	4' x 3'	Conc. Arch	208.5'	E. Br. 18 Mile Creek Br.	Not Inspected
118	5650+03	1	6' x 5'	203' Stone Arch 30' Conc. Arch	233'	E. Br. 18 Mile Creek Br.	Repairs Needed
119	5694+82	2	2@ 48" 6' x 5'	159' C.I.P. 110' Conc. Arch	269'	E. Br. 18 Mile Creek Br.	Good condition. Minor repairs and cleaning needed.
120	5722+15	1	6' x 5'	228.5' Stone Arch 35' Conc. Arch 12'+ Conc. Box 25'± Metal Arch	300'±	E. Br. 18 Mile Creek Br.	Good condition
121	5746+33	1	42" 4' x 3' 4' x 3'	165' C.I.P. 36' Conc. Arch 29' Conc. Box	230'	E. Br. 18 Mile Creek Br.	Good condition. Repair Joint and fill hole.
122	5766+42	1		Conc. Box	235'	E. Br. 18 Mile Creek Br.	Good condition
123 Dive	5791+60	1	30"	C.I.P.	262'	E. Br. 18 Mile Creek Br.	Good condition
124	5840+18	1	2.5' x 2.5'	Conc. Box	157'	18 Mile Creek Br.	Not Inspected
125 Dive	5847+50	1	12' x 5'10"	118' Conc. Arch 40' Stone Arch	158'	18 Mile Creek	Not Inspected

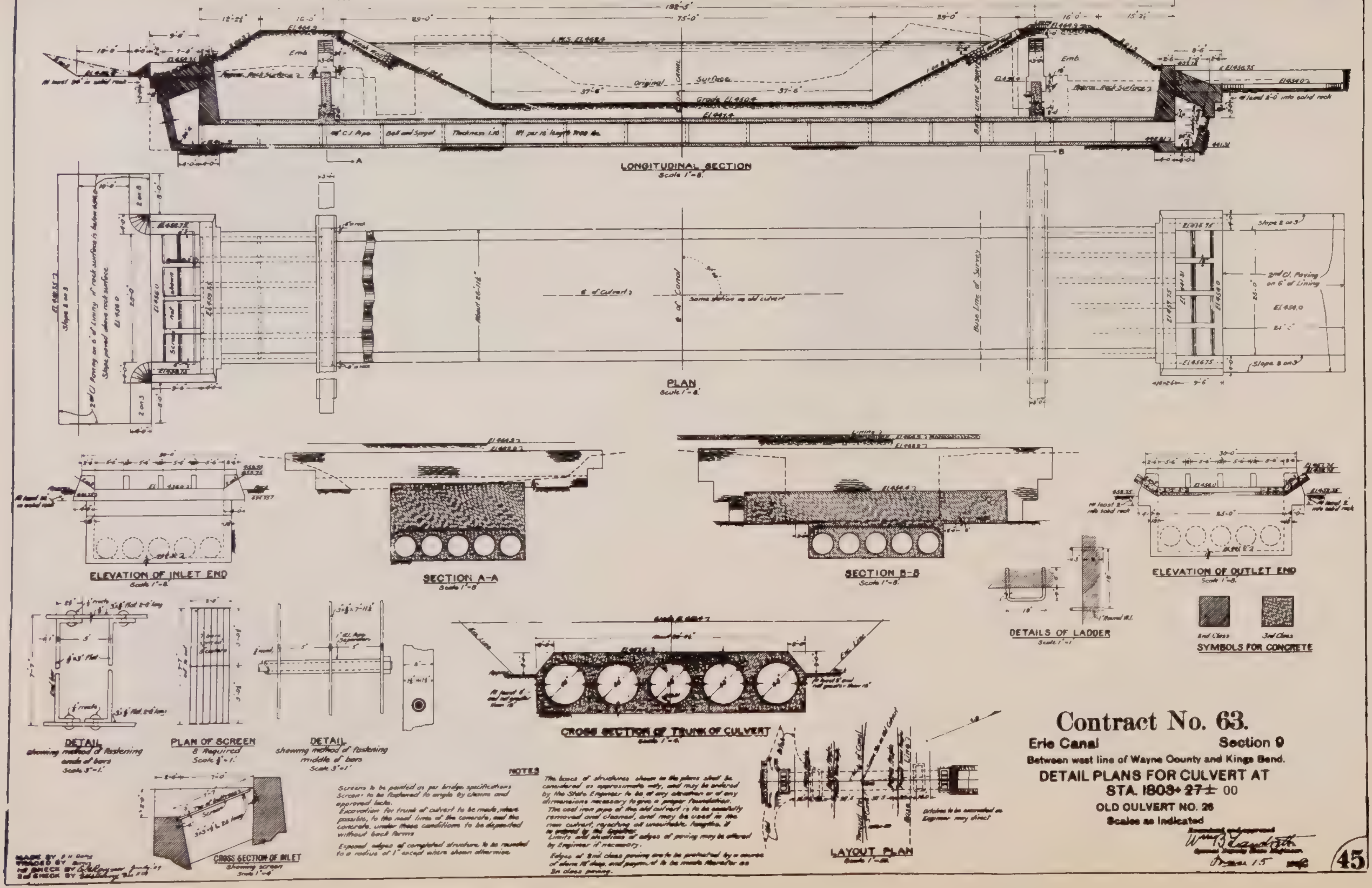
Culvert #26 (Dive) 192.5' of 5-48" Cast Iron Pipes
Not Inspected

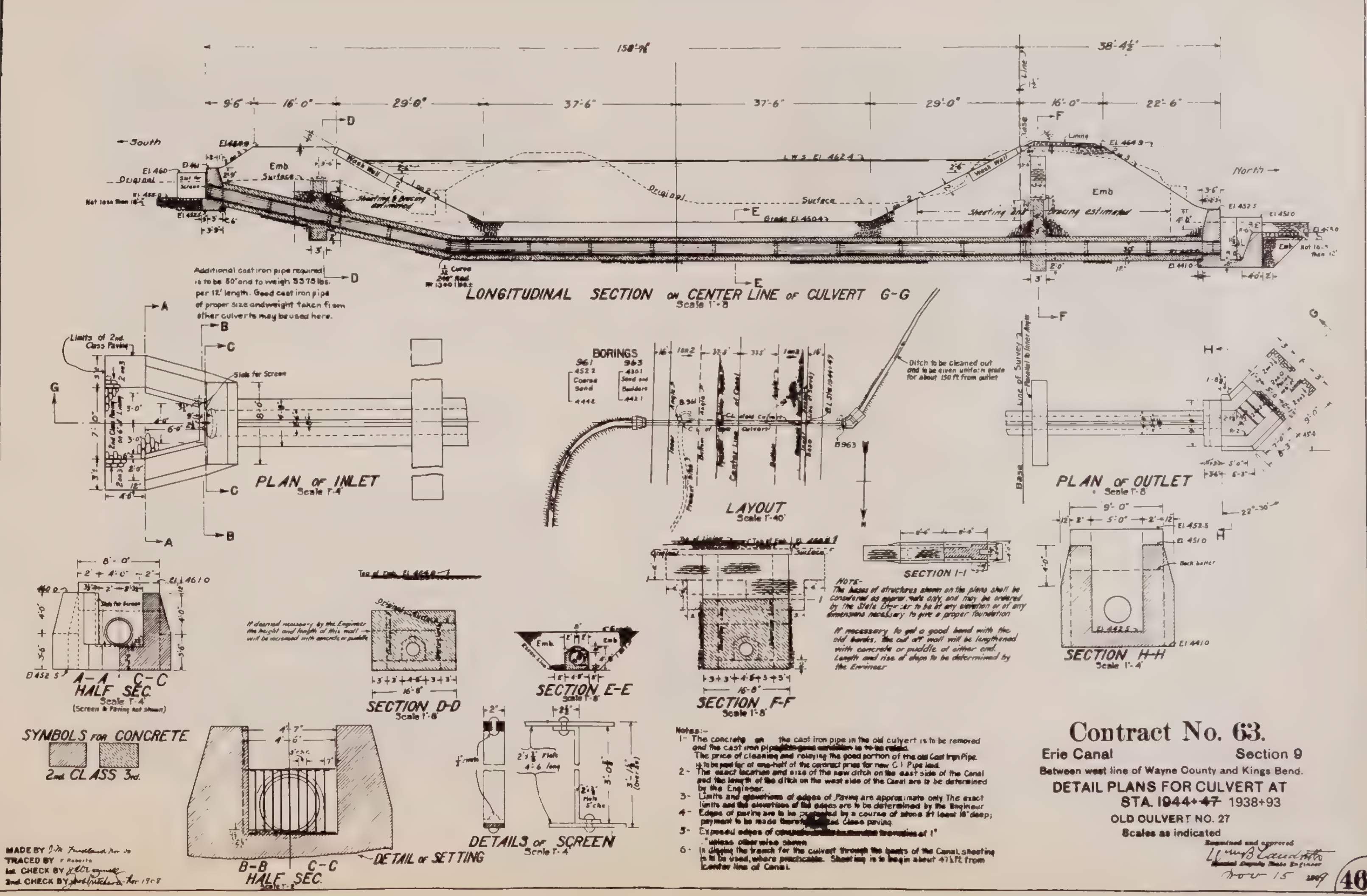
Exit
High Water Covered Headwall

Culvert #27 (Dive) 197' of 30" Cast Iron Pipe
Not Inspected

Exit
Concrete headwall was in good condition. After cleaning by Canal Maintenance Forces, first 12 feet at exit was inspected, but rest of pipe was half full of mud.

Exit area after embankment cleared for widening in 1976. Culvert is to be lengthened. These deep culvert wells present hazards to children in residential areas.


LONGITUDINAL SECTION
Scale 1"=8'
PLAN
Scale 1"=8'
ELEVATION OF INLET END
Scale 1"=8'
SECTION A-A
Scale 1"=8'
SECTION B-B
Scale 1"=8'
ELEVATION OF OUTLET END
Scale 1"=8'
DETAILS OF LADDER
Scale 1"=1'
2nd Class
3rd Class
SYMBOLS FOR CONCRETE
DETAIL
showing method of fastening
ends of bars
Scale 3"=1'
PLAN OF SCREEN
8 Required
Scale 3/4"=1'
DETAIL
showing method of fastening
middle of bars
Scale 3"=1'
CROSS SECTION OF TRUNK OF CULVERT
CROSS SECTION OF INLET
Showing screen
LAYOUT PLAN
NOTES
Screens to be painted as per bridge specifications
Screens to be fastened to angle by clamps and
approved locks.
Excavation for trunk of culvert to be made, where
possible, to the neat lines of the concrete, and the
concrete, under these conditions to be deposited
without back forms
Exposed edges of completed structure to be rounded
to a radius of 1" except where shown otherwise.
The bases of structures shown in the plans shall be
considered as approximate only, and may be ordered
by the State Engineer to be at any elevation or of any
dimensions necessary to give a proper foundation.
The cast iron pipe of the old culvert is to be carefully
removed and cleaned, and may be used in the
new culvert, rejecting all unsuitable lengths, if
so ordered by the Engineer.
Limits and elevations of edges of paving may be altered
by Engineer if necessary.
Edges of 2nd class paving are to be protected by a course
of stone 18" deep, and payment to be made therefor as
2nd class paving.
Contract No. 63.
Erie Canal
Section 9
Between west line of Wayne County and Kings Bend.
DETAIL PLANS FOR CULVERT AT
STA. 1803+ ~~27±~~ 00
OLD CULVERT NO. 26
Scales as indicated
45



Notes:-

1- The concrete on the cast iron pipe in the old culvert is to be removed and the cast iron pipe if in good condition is to be relaid. The price of cleaning and relaying the good portion of the old Cast Iron Pipe is to be paid for at one-half of the contract price for new C.I. Pipe laid.
2- The exact location and size of the new ditch on the east side of the Canal and the length of the ditch on the west side of the Canal are to be determined by the Engineer.
3- Limits and elevations of edges of Paving are approximate only. The exact limits and the elevations of the edges are to be determined by the Engineer.
4- Edges of paving are to be protected by a course of stone at least 18" deep; payment to be made therefor as ... class paving.
5- Exposed edges of concrete ... of 1" unless otherwise shown.
6- In digging the trench for the culvert through the banks of the Canal, sheeting is to be used, where practicable. Sheeting is to begin about 47½ ft. from center line of Canal.

Contract No. 63.

Erie Canal — Section 9

Between west line of Wayne County and Kings Bend.

DETAIL PLANS FOR CULVERT AT STA. ~~1944+47~~ 1938+93

OLD CULVERT NO. 27

Scales as indicated

Examined and approved
Special Deputy State Engineer
Nov 15 1909

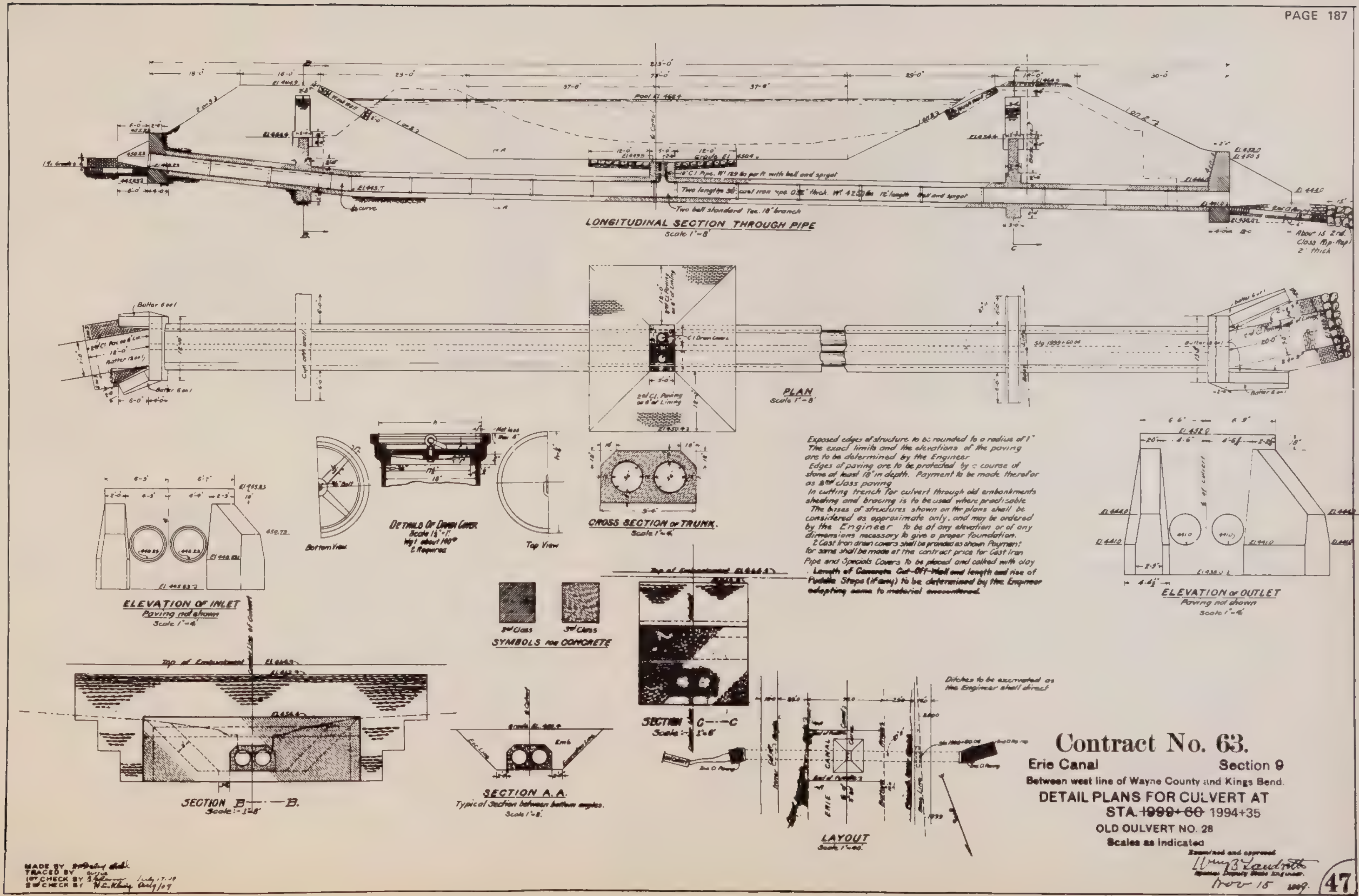
Culvert #28 213' of Twin 36" Cast Iron Pipes

Entrance
Trash rack in foreground. Some localized deep scaling on headwall, but generally in good condition.

Cast-iron culvert was in good condition. Some seepage noted at nearly all joints.

Old Exit
Deep scour hole at exit. Headwall area in good condition. Sewer crosses stream in foreground.

New Exit
In 1976, embankment was widened and culvert lengthened. Light snow on ground.


LONGITUDINAL SECTION THROUGH PIPE
Scale 1"=8'
PLAN
Scale 1"=8'
Exposed edges of structure to be rounded to a radius of 1"
The exact limits and the elevations of the paving are to be determined by the Engineer
Edges of paving are to be protected by a course of stone at least 18" in depth. Payment to be made therefor as 2nd class paving
In cutting trench for culvert through old embankments sheeting and bracing is to be used where practicable
The bases of structures shown on the plans shall be considered as approximate only, and may be ordered by the Engineer to be at any elevation or of any dimensions necessary to give a proper foundation.
2 Cast Iron drain covers shall be provided as shown. Payment for same shall be made at the contract price for Cast Iron Pipe and Specials. Covers to be placed and calked with clay
Length of Concrete Cut-Off-Wall and length and rise of Puddle Steps (if any) to be determined by the Engineer adapting same to material encountered.
ELEVATION OF INLET
Paving not shown
Scale 1"=4'
Details Of Drain Cover
Bottom View
Top View
CROSS SECTION OF TRUNK.
SYMBOLS FOR CONCRETE
2nd Class
3rd Class
ELEVATION OF OUTLET
Paving not shown
SECTION B—B.
SECTION A.A.
Typical Section between bottom angles.
SECTION C—C
LAYOUT
Contract No. 63.
Erie Canal
Section 9
Between west line of Wayne County and Kings Bend.
DETAIL PLANS FOR CULVERT AT
STA. 1999+60 1994+35
OLD CULVERT NO. 28
Scales as indicated
Examined and approved
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY

Old Culvert #29 6' Wide x 5' High Stone Block Arch
Lined in 1914 with 48" Cast Iron Pipe

New Culvert #29 333' of 84" Concrete Pipe
Constructed in 1975 under Contract M 75-2

See History - Barge Canal Construction
Bushnell Basin to Cartersville

Exit

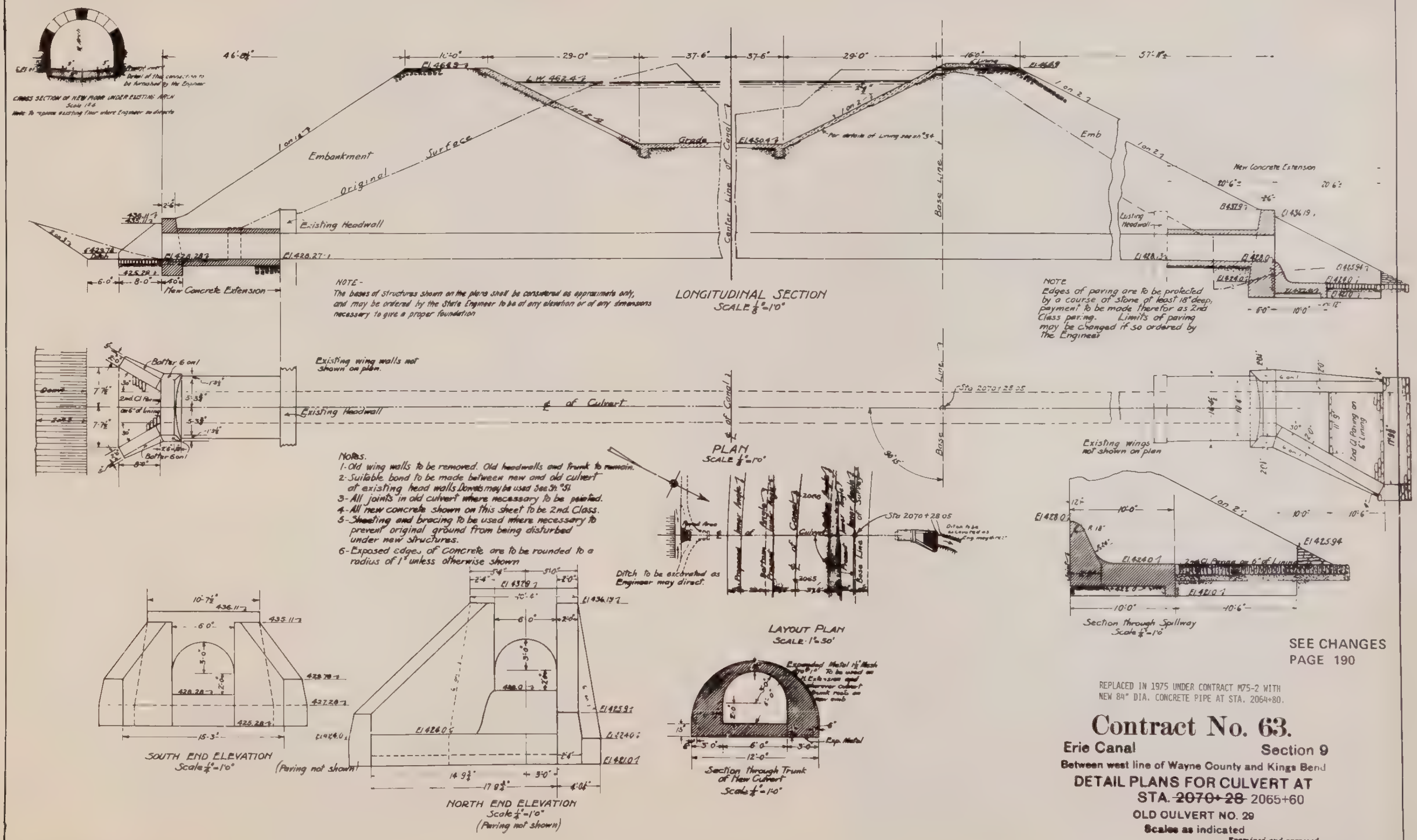
Entrance and exit headwall areas and culvert never thoroughly inspected. However, all joints in the cast iron lining, as seen from both ends, were heavily coated with mineral deposits. This means slow seepage through the joints.

Entrance under Construction

Concrete wall around entrance restricts flow to two 30" openings until water rises over top of wall.

Exit and New Embankment

Manhole on left contained devices to measure embankment settlement.



SEE CHANGES
PAGE 190

REPLACED IN 1975 UNDER CONTRACT M75-2 WITH NEW 84" DIA. CONCRETE PIPE AT STA. 2064+80.

Contract No. 63.

Erie Canal — Section 9

Between west line of Wayne County and Kings Bend

DETAIL PLANS FOR CULVERT AT STA. ~~2070+28~~ 2065+60

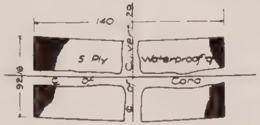
OLD CULVERT NO. 29

Scales as indicated

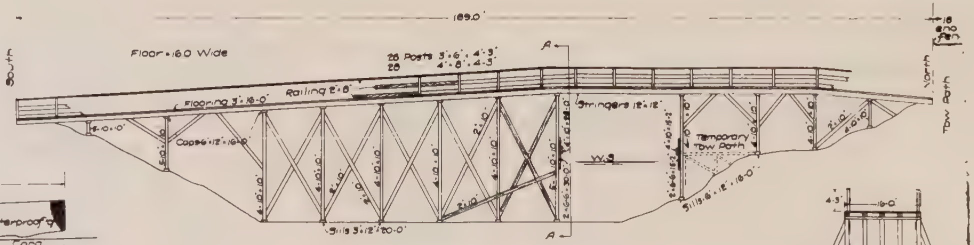
Examined and approved
Wm B. Landreth
Special Deputy State Engineer.
Nov 15 1909

MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY

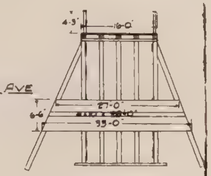
LAYOUT
Scale 1"=100'



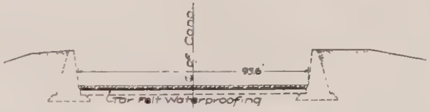
PLAN OF TAR FELT WATERPROOFING.
Scale 1"=20'



LONGITUDINAL SECTION OF TEMPORARY BRIDGE AT MONROE AVE
Scale 1"=10'

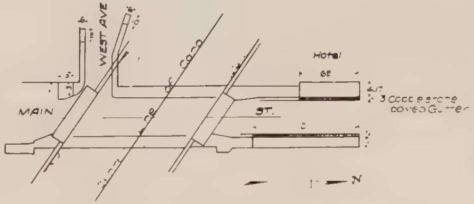


SECTION A-A
Scale 1"=20'



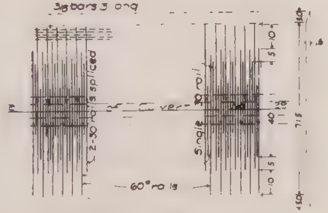
CROSS SECTION THRU SLAB
Scale 1"=20

SUMMARY OF ITEMS			
LOCATION.	ITEM.	MEASURE	AMOUNT
Bushnells Basin Trough	Rein Concrete	Cu Yds.	422
" " "	Tar Felt Waterproofing.	Sq. Ft.	12,902
" " "	Metal Reinforcement.	Lbs	68,444
Temporary Bridge at Monroe Ave	(Y.P. or D.F.) Sawed Lumber.	M.Ft B M	44
Main St. Lift Bridge at Fairport.	Portland Cement Sidewalks.	Sq. Ft.	2,450
Main St. Lift Bridge at Fairport	Cobble Stone Paving.	Sq. Yds	125
Knapps Bridge South Approach	Wooden Fence	Lin. Ft.	400

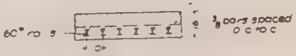


LAYOUT OF MAIN ST. LIFT BRIDGE, FAIRPORT.
Scale 1"=50'

SECTION OF SIDEWALK
Scale 3/16"=1'-0

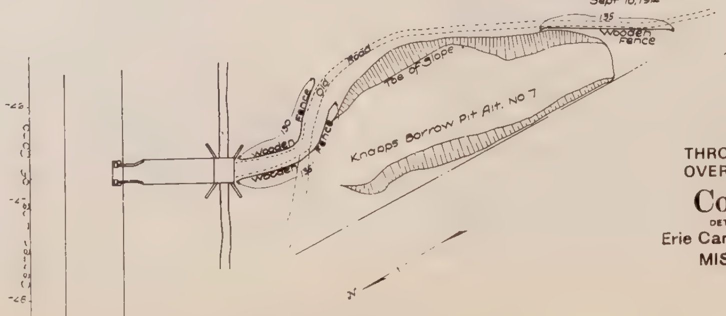


PLAN SHOWING METAL REINFORCEMENT
Scale 1"=20

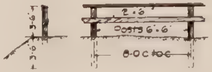


SECTION THRU CENTER OF SLAB

Examined and approved by
F. Williams
Division Engineer
Sept 18, 1914



LAYOUT OF SOUTH APPROACH-KNAPPS BRIDGE
Scale 1"=50'



DETAIL OF FENCE
Scale 1/4"=1'-0

THROUGH FLOOR REINFORCED
OVER CULVERT NO. 29

Contract No. 63.

DETAIL SHEET ALTERATION NO. 15

Erie Canal Section 9

MISCELLANEOUS DETAILS

Scales as indicated

Examined and approved
Sept 23 1914
D.A. La Du
Special Deputy State Engineer

I

Made by ... Sept 4
Checked by ... Sept 1914

Culvert #30 508' of Twin 12' Wide x 9' High
Concrete Boxes

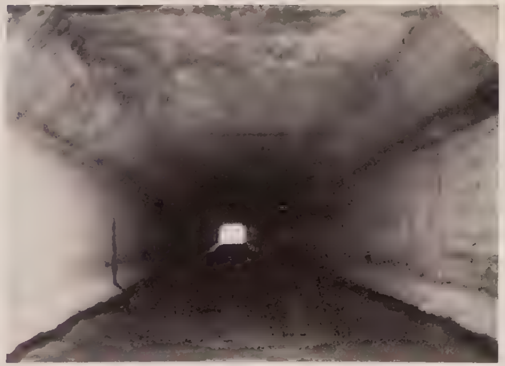
See History-Barge Canal Construction
Bushnell Basin to Cartersville

Entrance
Headwall and wingwall areas in good condition

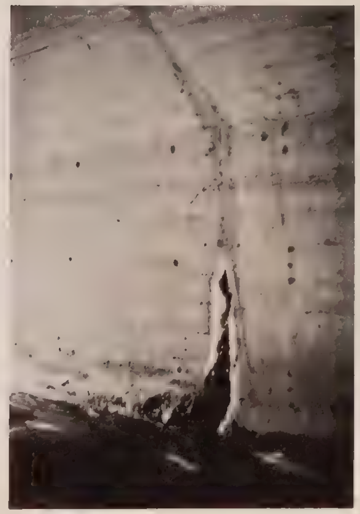
Exit
Deicing chemicals and freeze-thaw action have caused cracks and scaling on top of headwall. Wingwalls in good condition, except for a few cracks at the ends.

Deep eroded or honeycombed area at south end of west barrel

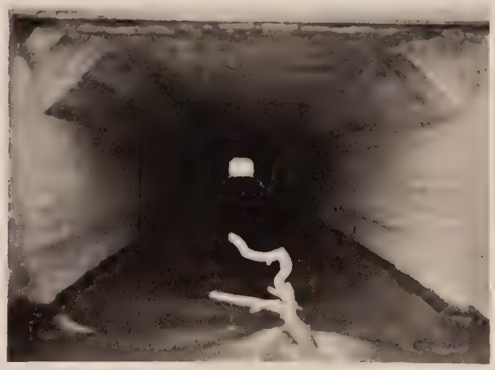
Looking Downstream from Exit
Note bank erosion and attempts to stop it.



East Barrel - Looking South or Upstream From Exit



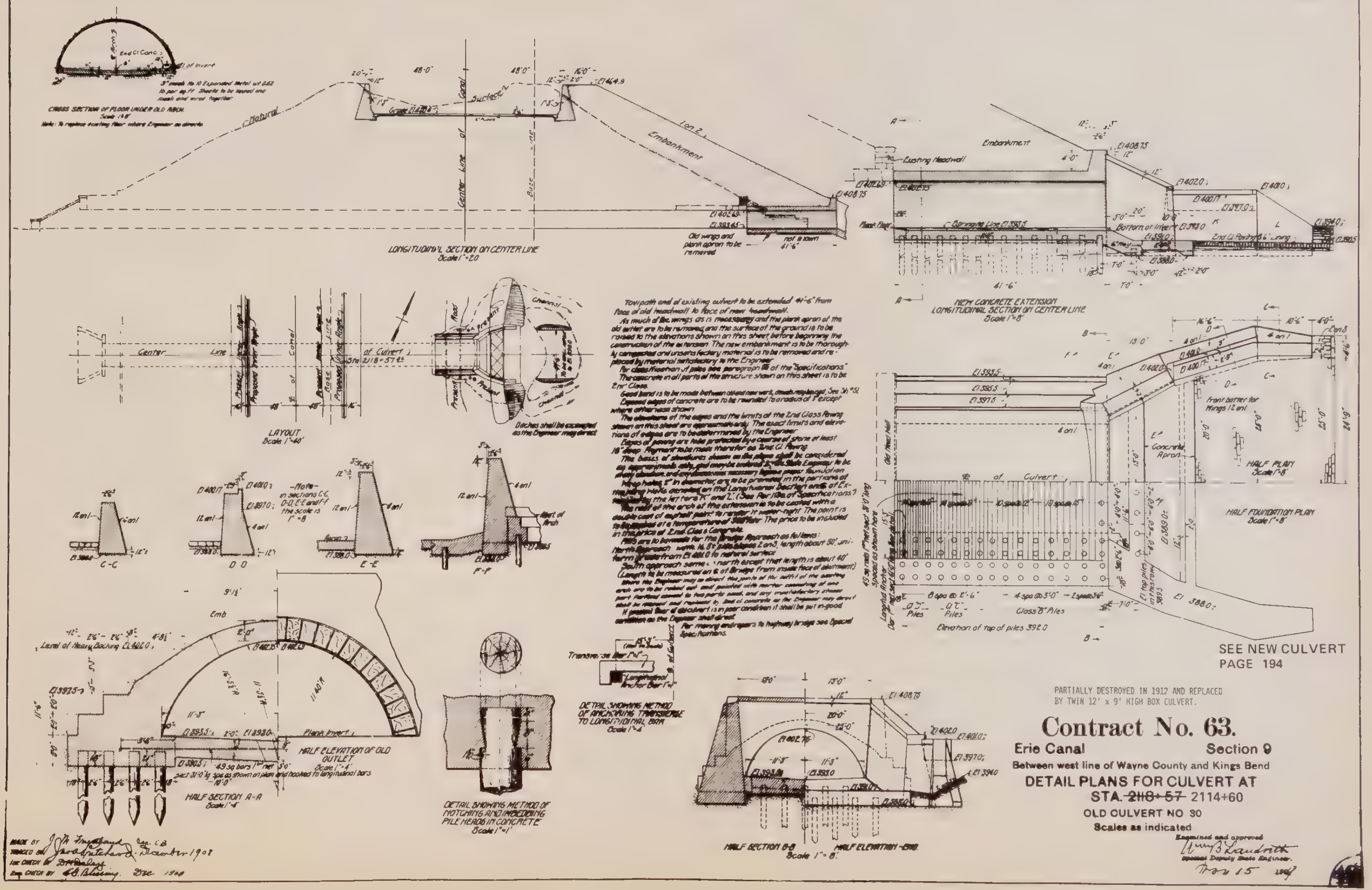
South End of West Barrel
Slow seepage at scaled or
eroded joint area.



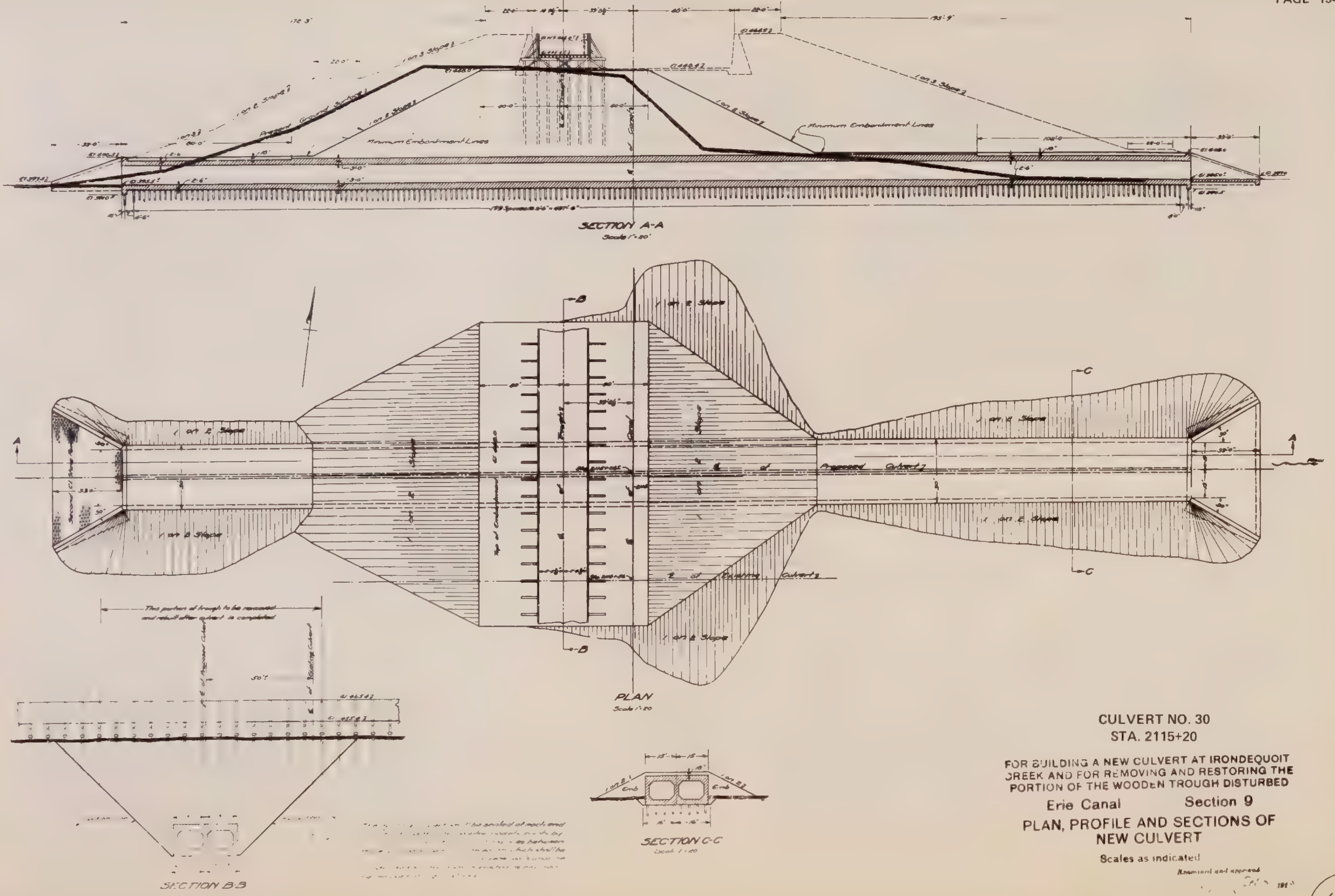
West Barrel - Looking South or Upstream From Exit

One construction joint near middle of barrel open 3/4-1". Two deep scaled or eroded areas - 4' x 5' area and 1½' x 30' long area on east wall 150' from south end or entrance. These eroded areas may have been honeycombed areas that were patched during construction and have scaled away. Many isolated areas where concrete cover has popped off due to rusting "high" steel. A few bars were heavily rusted. Barrel generally in good condition.

One construction joint near middle of barrel open 3/4-1". Joints mainly near barrel ends have a little seepage. Very little seepage elsewhere. Most seepage starts a foot or two above triangular concrete floor corners. Many isolated areas where concrete cover has popped off due to rusting "high" steel. A few bars were heavily rusted. 1' x 2' eroded or scaled area 50' from south end or entrance on west wall. Barrel generally in good condition.



CROSS SECTION OF FLOOR UNDER OLD ARCH.
LONGITUDINAL SECTION ON CENTER LINE
Scale 1" = 20
Embankment
Existing Headwall
NEW CONCRETE EXTENSION
LONGITUDINAL SECTION ON CENTER LINE
Scale 1" = 8'
LAYOUT
Scale 1" = 40'
HALF PLAN
Scale 1" = 8'
HALF FOUNDATION PLAN
Scale 1" = 8'
C-C
D-D
E-E
F-F
HALF ELEVATION OF OLD OUTLET
Scale 1" = 4'
HALF SECTION A-A
Scale 1" = 4'
DETAIL SHOWING METHOD OF NOTCHING AND IMBEDDING PILE HEADS IN CONCRETE
Scale 1" = 1'
DETAIL SHOWING METHOD OF ANCHORING TRANSVERSE TO LONGITUDINAL BAR
HALF SECTION B-B
HALF ELEVATION - END.
Scale 1" = 8'
Class "B" Piles
Elevation of top of piles 392.0
SEE NEW CULVERT
PAGE 194
PARTIALLY DESTROYED IN 1912 AND REPLACED
BY TWIN 12' x 9' HIGH BOX CULVERT.
Contract No. 63.
Erie Canal
Section 9
Between west line of Wayne County and Kings Bend
DETAIL PLANS FOR CULVERT AT
STA. 2118+57 2114+60
OLD CULVERT NO 30
Scales as indicated
Examined and approved
Special Deputy State Engineer.



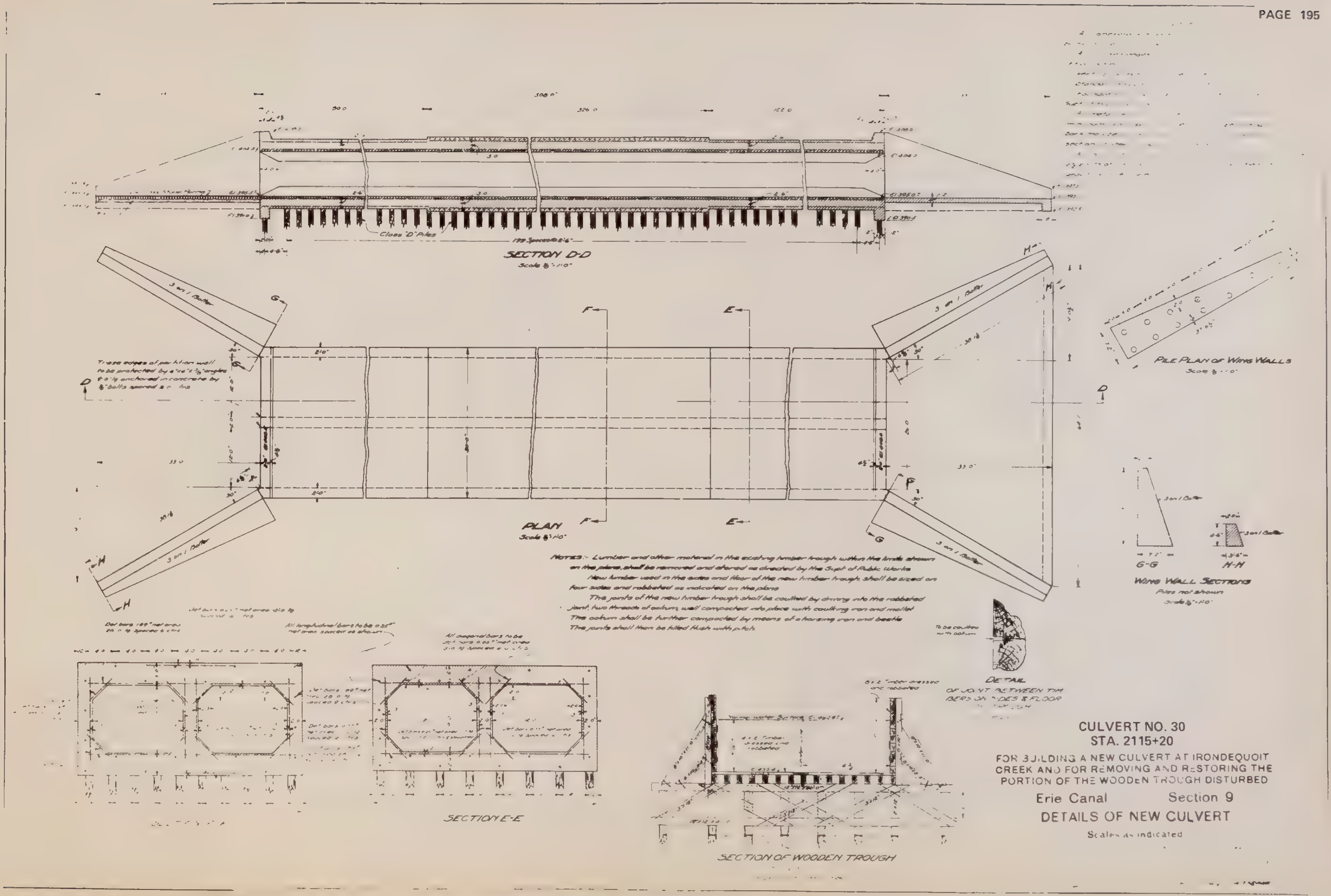
CULVERT NO. 30
STA. 2115+20

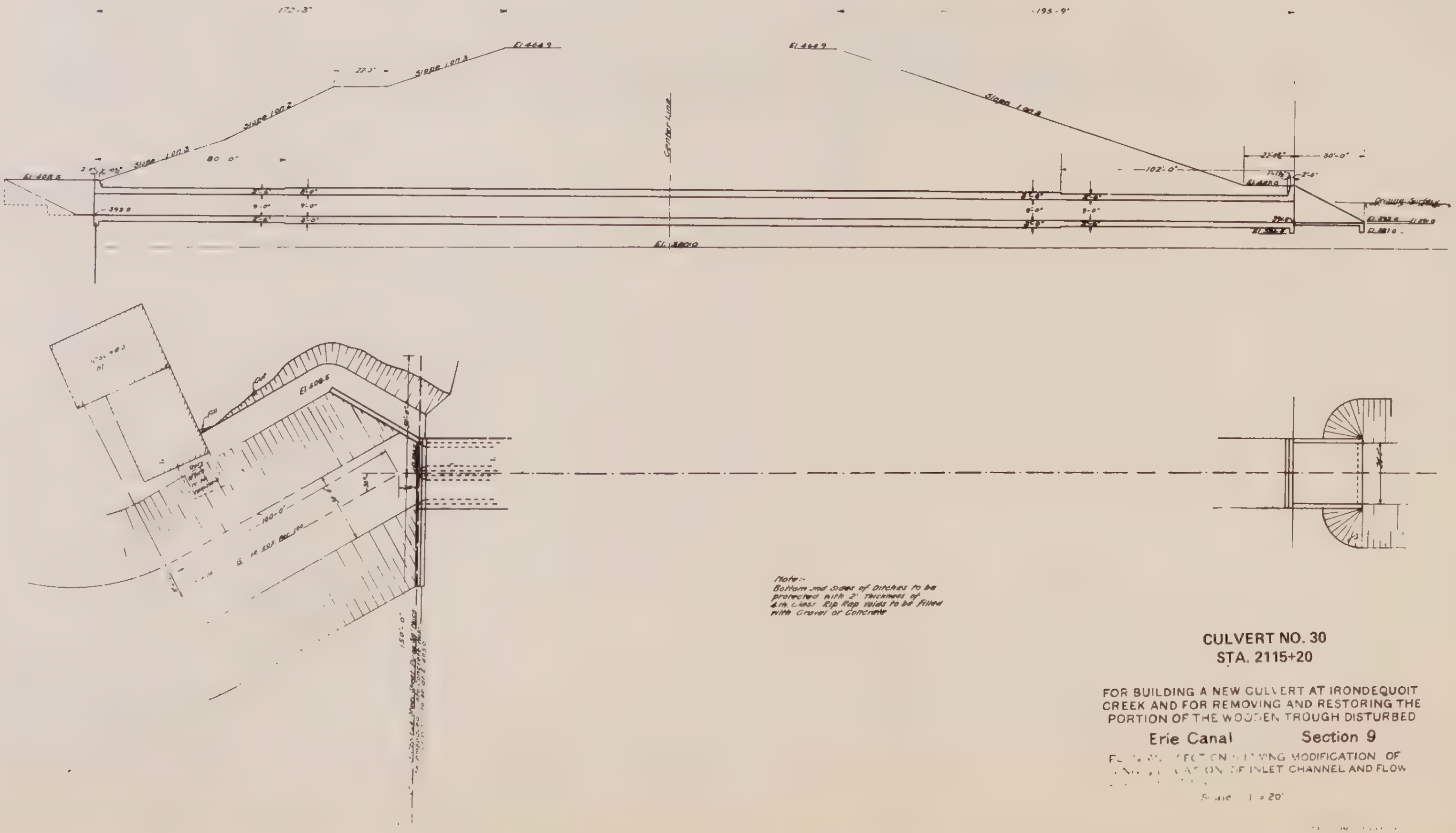
FOR BUILDING A NEW CULVERT AT IRONDEQUOIT CREEK AND FOR REMOVING AND RESTORING THE PORTION OF THE WOODEN TROUGH DISTURBED

Erie Canal Section 9

PLAN, PROFILE AND SECTIONS OF NEW CULVERT

Scales as indicated


SECTION D-D
Class "D" Piles
PLAN
3 on 1 Batter
PILE PLAN OF WING WALLS
WING WALL SECTIONS
Piles not shown
G-G
H-H
NOTES:- Lumber and other material in the existing timber trough within the limits shown on the plans, shall be removed and stored as directed by the Supt of Public Works
New lumber used in the sides and floor of the new timber trough shall be sized on four sides and rabbeted as indicated on the plans.
The joints of the new timber trough shall be caulked by driving into the rabbeted joint, two threads of oakum, well compacted into place with caulking iron and mallet. The oakum shall be further compacted by means of a horsing iron and beetle. The joints shall then be filled flush with pitch.
DETAIL
SECTION E-E
SECTION OF WOODEN TROUGH
CULVERT NO. 30
STA. 2115+20
FOR BUILDING A NEW CULVERT AT IRONDEQUOIT CREEK AND FOR REMOVING AND RESTORING THE PORTION OF THE WOODEN TROUGH DISTURBED
Erie Canal
Section 9
DETAILS OF NEW CULVERT
Scales as indicated



CULVERT NO. 30
STA. 2115+20

FOR BUILDING A NEW CULVERT AT IRONDEQUOIT CREEK AND FOR REMOVING AND RESTORING THE PORTION OF THE WOODEN TROUGH DISTURBED

Erie Canal Section 9

[illegible] MODIFICATION OF [illegible] OF INLET CHANNEL AND FLOW [illegible]

Scale 1" = 20'

Culvert #30½ 598' of 2' x 2' Concrete Box
116' of 6" Cast Iron Pipe

Not Inspected

See History - Barge Canal Construction
Bushnell Basin to Cartersville

Entrance in Foreground under Sanitary Landfill

On the north side of the canal at the west end of the Irondequoit Trough is the Town of Perinton Sanitary Landfill Site. It is doubtful whether anyone discovered the culvert entrance prior to land fill operations as it would have been hidden by brush.

A thorough search was made for the culvert exit (6" cast iron pipe encased in 1' of concrete) on the south side of the Irondequoit embankment at the toe of slope, but only an old roadway culvert drainage channel with a concrete endwall was found.

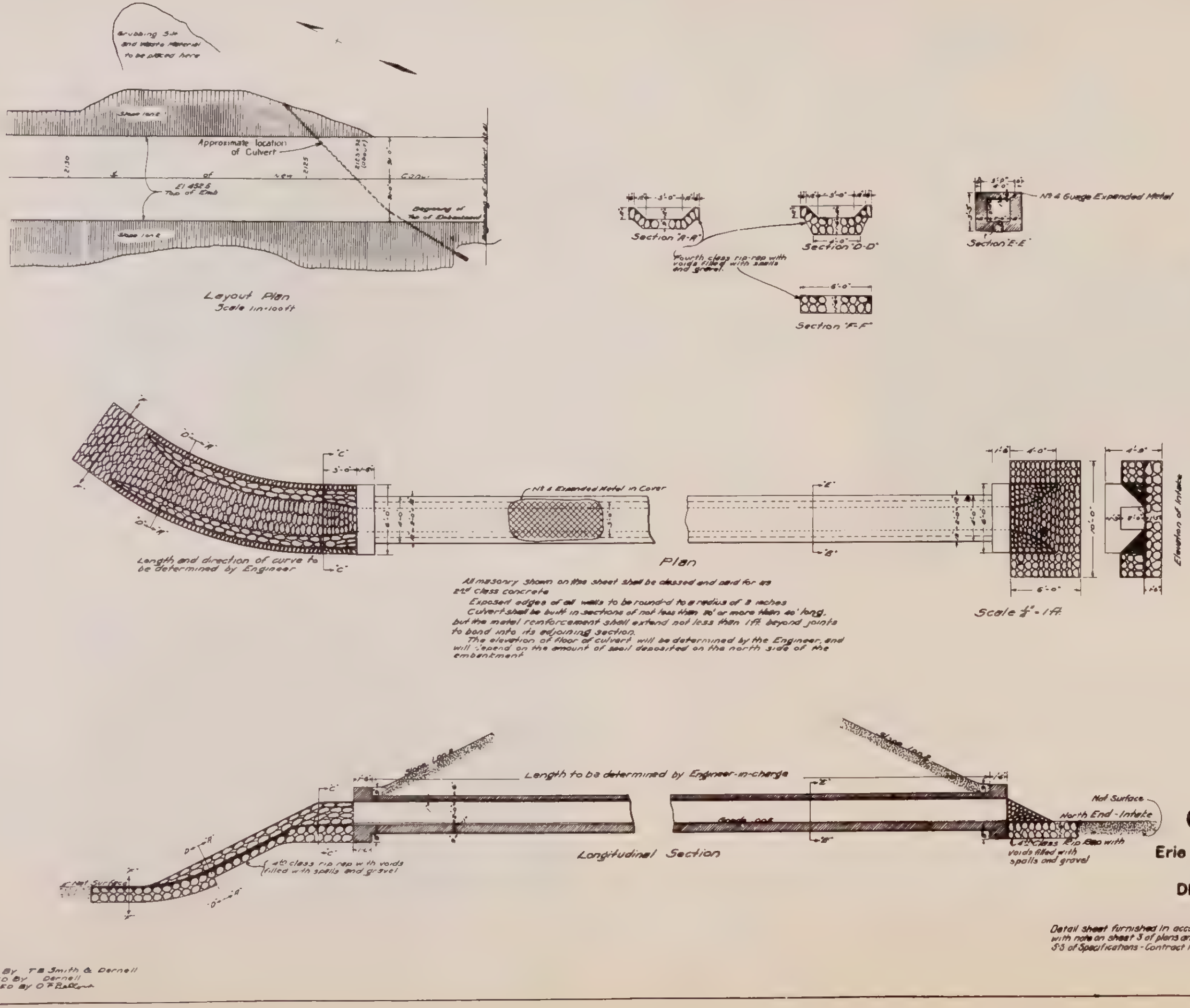
The culvert no longer serves any purpose and should be well protected in the embankment from deterioration. However, this culvert should not be forgotton as it is still a hollow structure capable of carrying water.

Culvert #31 (Dive) 192.5' of 42" Cast Iron Pipe +
135' Extension

Not Inspected

Entrance
Headwall and wingwalls were in fair condition. There were many cracks, but the concrete sounded solid.

Exit
Headwall and wingwalls in good condition, except for many cracks on right wingwall.



SEE CHANGES
PAGE 400

CULVERT NO. 30½

Contract No. 41.

Erie Canal — Section 9

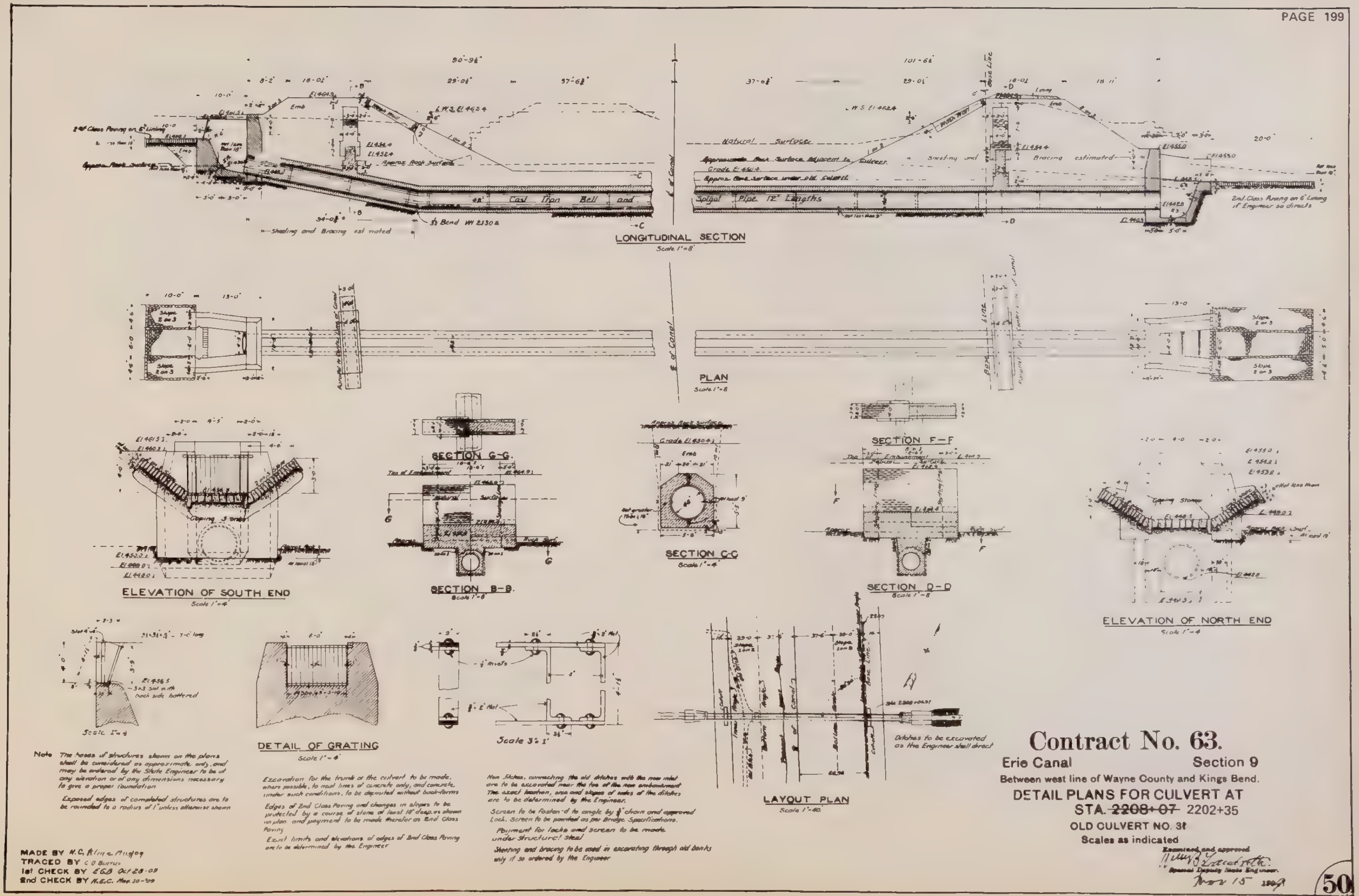
At Irondequoit Creek Crossing

DETAILS OF CULVERT UNDER EAST EMBANKMENT

Scales as indicated

Detail sheet furnished in accordance with note on sheet 3 of plans and paragraph 5·3 of Specifications - Contract No 41.

Examined and approved
Wm. B. Landreth
Special Deputy State Engineer.
Sept. 5 — 1907.


LONGITUDINAL SECTION
Scale 1" = 8'
Cast Iron Bell and Spigot Pipe 12' Lengths
Natural Surface
Sheeting and Bracing estimated
PLAN
Scale 1" = 8'
ELEVATION OF SOUTH END
Scale 1" = 4'
SECTION G-G
SECTION B-B
Scale 1" = 8'
SECTION C-C
Scale 1" = 4'
SECTION F-F
SECTION D-D
Scale 1" = 8'
ELEVATION OF NORTH END
Scale 1" = 4'
DETAIL OF GRATING
Scale 1" = 4'
Scale 3" = 1'
LAYOUT PLAN
Scale 1" = 40'
Ditches to be excavated as the Engineer shall direct
Note The bases of structures shown on the plans shall be considered as approximate only, and may be ordered by the State Engineer to be at any elevation or of any dimensions necessary to give a proper foundation
Exposed edges of completed structures are to be rounded to a radius of 1" unless otherwise shown
Excavation for the trunk of the culvert to be made, where possible, to neat lines of concrete only, and concrete under such conditions, to be deposited without back-forms
Edges of 2nd Class Paving and changes in slopes to be protected by a course of stone at least 18" deep, as shown in plan, and payment to be made therefor as 2nd Class Paving
Exact limits and elevations of edges of 2nd Class Paving are to be determined by the Engineer
New ditches, connecting the old ditches with the new inlet are to be excavated near the toe of the new embankment. The exact location, area and slopes of sides of the ditches are to be determined by the Engineer.
Screen to be fasten-d to angle by 3/8" chain and approved Lock. Screen to be painted as per Bridge Specifications.
Payment for locks and screen to be made under Structural Steel
Sheeting and bracing to be used in excavating through old banks only if so ordered by the Engineer
MADE BY N.C. Kline Aug/09
TRACED BY C.O. Burrus
1st CHECK BY E.G.B. Oct 28-09
2nd CHECK BY N.E.C. Nov 30-09
Contract No. 63.
Erie Canal
Section 9
Between west line of Wayne County and Kings Bend.
DETAIL PLANS FOR CULVERT AT
STA. ~~2208+07~~ 2202+35
OLD CULVERT NO. 31
Scales as indicated
Examined and approved
Special Deputy State Engineer.
Nov 15 1909
50

Culvert #33 (Dive) 185' of 8' x 8' Concrete Box

Not Inspected

Entrance

This is the entrance to the railroad culvert. After approximately 75', the floor slopes down and the canal culvert begins. The stone block arch railroad culvert and the beginning of the canal culvert appeared in good condition. Some heavy seepage was occurring at the joint between the two sections.

Exit

Headwall and wingwalls appeared in good condition. In 1976, this end of culvert is to be lengthened due to embankment widening.

Culvert #34 (Dive) 304' of 42" Cast Iron Pipe

Not Inspected

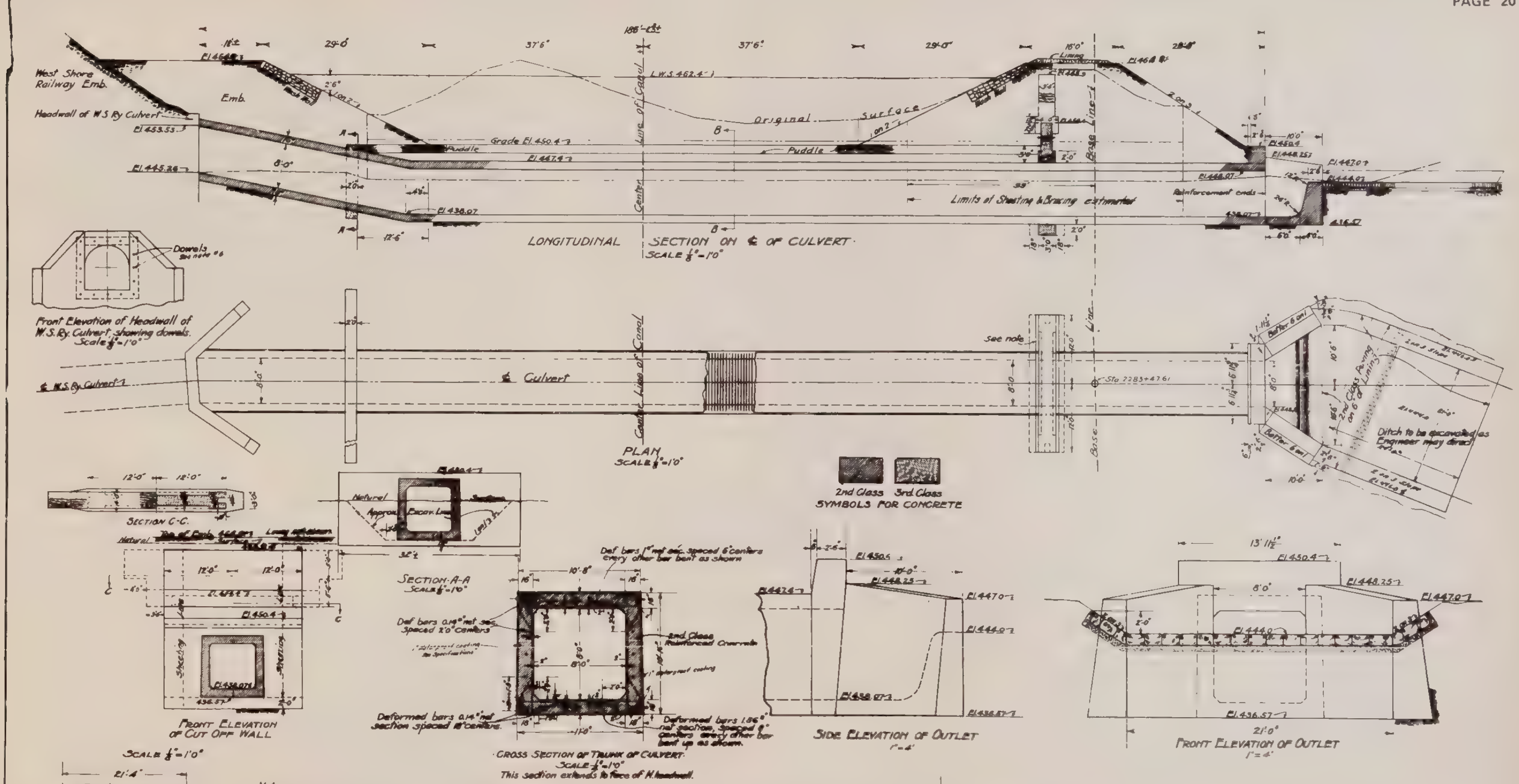
Entrance

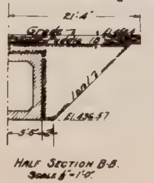
Top of headwall deeply scaled. Many efflorescent covered cracks exist on rest of exposed wall.

Exit

Headwall appeared in good condition. Left wingwall was undermined, heavily cracked and ready to fall apart. Right wingwall was half missing and rest was mostly fractured concrete.

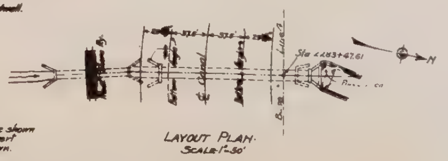
A short distance downstream is a small stone block arch culvert under the old Erie Canal. This culvert appeared in good condition from both ends.





Notes:

1- The bases of structures shown on the plans shall be considered as approximate only, and may be ordered by the State Engineer to be at any elevation or of any dimensions necessary to give a proper foundation.
2- Existing culvert to be removed.
3- The N Wing Walls of the West Shore Ry. culvert are to be removed if necessary and great care taken to secure a good bond between the trunk of the new culvert and the trunk of the W.S. Ry. culvert at the headwall of the latter.
4- The location of the ℄ of new culvert is to be determined by Sta 2283+47.61 of the Base Line and the ℄ of the W.S. Ry. culvert at the face of its North headwall.
5- Exposed edges of completed structure to be rounded to a radius of 1" except where otherwise shown
6- Dowels to consist of 1" round W.I. bars 18" long set 9" into existing headwall and 9" into new culvert trunk, 16 required spaced evenly around centre line of cross section of culvert as shown.
7- Cut off walls to be 3rd Class concrete. If unsatisfactory material is found for the foundation of the Cut off wall, the foundation is to be extended as shown by the dotted lines on the plans.
8- Puddle to extend 6' into undisturbed material on each side of culvert
9- Edges of 2nd Class paving are to be protected by a course of stone 18" deep, and payment to be made therefor as 2nd Class paving.
10 If necessary to get a good bond with the old banks the cut off wall will be lengthened with Concrete or Puddle at either end. Length and rise of steps to be determined by the Engineer.
11- In excavating through old bank sheeting and bracing to be used only if so ordered by the Engineer.



MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY

Contract No. 63.

Erie Canal — Section 9

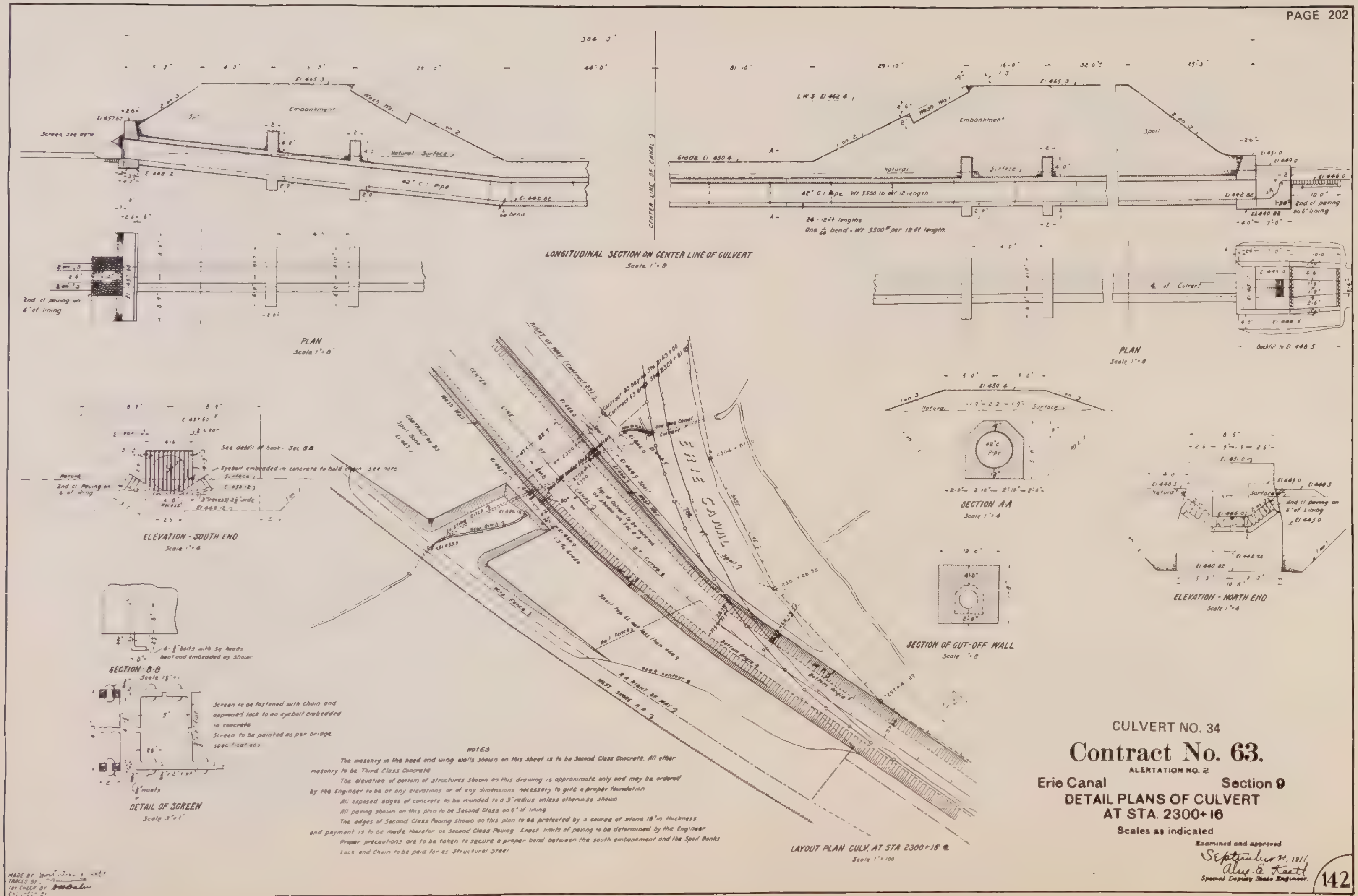
Between west line of Wayne County and Kings Bend.

DETAIL PLANS FOR CULVERT AT STA. ~~2283+48~~ 2276+60

OLD CULVERT NO. 83

Scales as Indicated

Recommended and approved
Wm. B. Landreth
Special Deputy State Engineer.



NOTES

The masonry in the head and wing walls shown on this sheet is to be Second Class Concrete. All other masonry to be Third Class Concrete

The elevation of bottom of structures shown on this drawing is approximate only and may be ordered by the Engineer to be at any elevations or of any dimensions necessary to give a proper foundation

All exposed edges of concrete to be rounded to a 3" radius unless otherwise shown

All paving shown on this plan to be Second Class on 6" of lining

The edges of Second Class Paving shown on this plan to be protected by a course of stone 18" in thickness and payment is to be made therefor as Second Class Paving. Exact limits of paving to be determined by the Engineer

Proper precautions are to be taken to secure a proper bond between the south embankment and the Spoil Banks

Lock and Chain to be paid for as Structural Steel

CULVERT NO. 34

Contract No. 63.

ALTERATION NO. 2

Erie Canal Section 9

DETAIL PLANS OF CULVERT AT STA. 2300+16

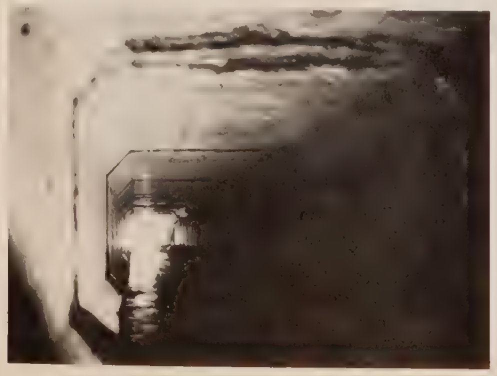
Scales as indicated

Examined and approved
September 21, 1911
Alex. E. Kastl
Special Deputy State Engineer.

Entrance
Headwall and wingwalls in good condition. Some spalling on bottom front of center pier wall. One 6" deep spall on left wingwall along a vertical construction joint. No cracks noted.

Exit - East Wingwall
Top of wingwall has moved inward 1'

Exit
Headwall has scaled in center area. Low end of right wingwall has scaled away 1" deep and bottom 3' was all cracked. Three 10" syphons flow from canal.

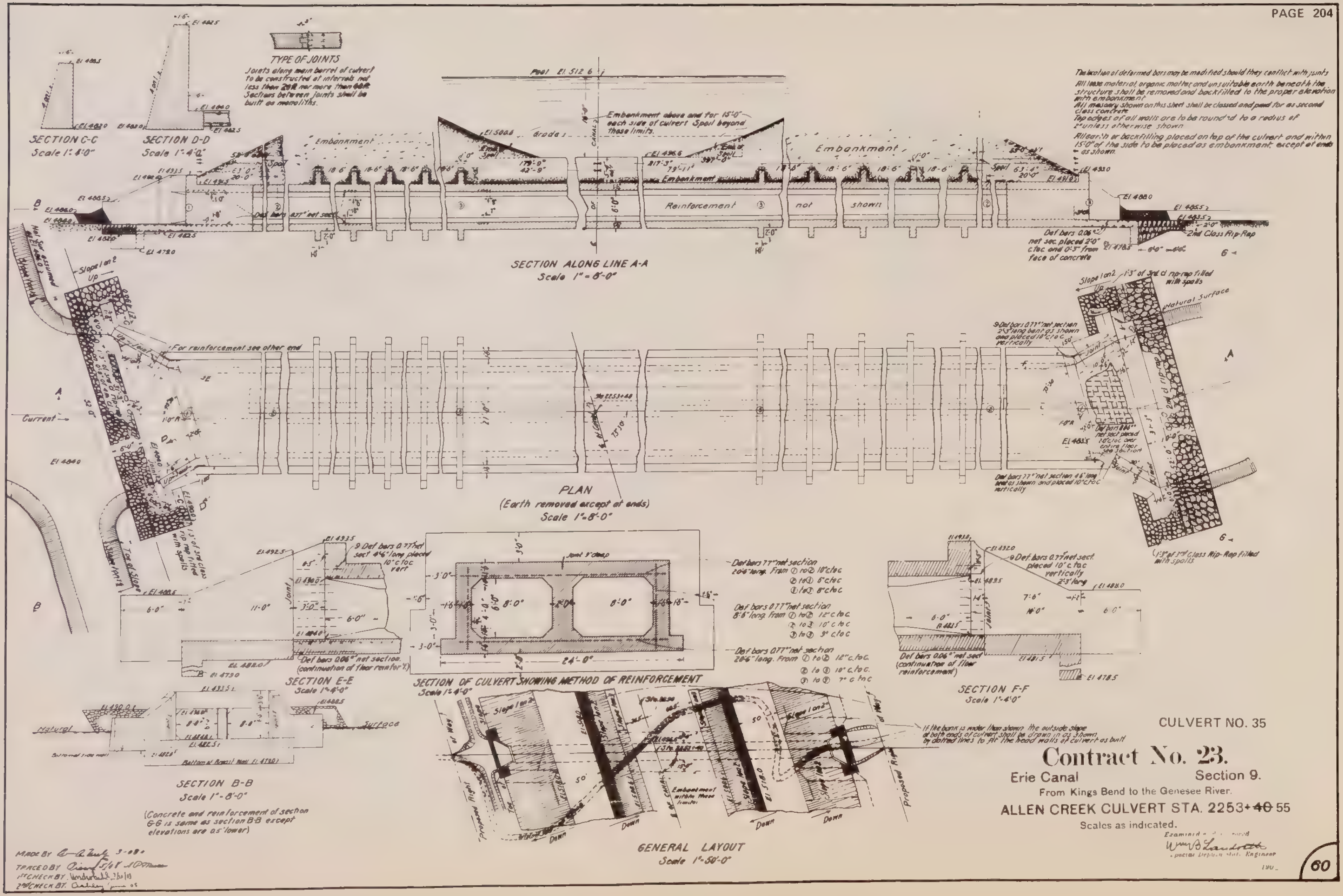


West Barrel - Looking North Toward Exit

East Barrel - Most of the joint areas were scaled 3-4" deep and 1' wide on each side of the joint. One joint near middle of barrel was leaking a constant drip size stream. The 2nd and 3rd joints in from the north or exit end were the worst. Scaling was 1-2' wide and 6" deep on each side of the joint. The ceiling had 3 areas that contained many efflorescent covered cracks and soda straws, but the areas were mostly dry.

West Barrel - Conditions in this barrel were similar to east barrel (joint deterioration and cracks). Steady drip size streams flowed through 4 of 5 joint areas.

The majority of the concrete was in good condition, but joint and other repairs are needed.


TYPE OF JOINTS
Joints along main barrel of culvert to be constructed at intervals not less than 20 ft nor more than 60 ft. Sections between joints shall be built as monoliths.
SECTION C-C
Scale 1"=4'-0"
SECTION D-D
Scale 1"=4'-0"
Pool El. 512.6
Embankment above and for 15'-0" each side of culvert. Spoil beyond these limits.
Embankment
Reinforcement not shown
SECTION ALONG LINE A-A
Scale 1"=8'-0"
The location of deformed bars may be modified should they conflict with joints.
All loose material, organic matter and unsuitable earth beneath the structure shall be removed and backfilled to the proper elevation with embankment.
All masonry shown on this sheet shall be classed and paid for as second class concrete.
Top edges of all walls are to be rounded to a radius of 2" unless otherwise shown.
All earth or backfilling placed on top of the culvert and within 15'-0" of the side to be placed as embankment, except at ends as shown.
2nd Class Rip-Rap
Current
For reinforcement see other end
Natural Surface
PLAN
(Earth removed except at ends)
Scale 1"=8'-0"
SECTION E-E
Scale 1"=4'-0"
SECTION OF CULVERT SHOWING METHOD OF REINFORCEMENT
Scale 1"=4'-0"
SECTION F-F
Scale 1"=4'-0"
SECTION B-B
Scale 1"=8'-0"
(Concrete and reinforcement of section G-G is same as section B-B except elevations are 0.5' lower)
GENERAL LAYOUT
Scale 1"=50'-0"
If the bank is wider than shown the outside slope at both ends of culvert shall be drawn in as shown by dotted lines to fit the head walls of culvert as built.
CULVERT NO. 35
Contract No. 23.
Erie Canal
Section 9.
From Kings Bend to the Genesee River.
ALLEN CREEK CULVERT STA. 2253+40 55
Scales as indicated.
MADE BY
TRACED BY
1ST CHECK BY
2ND CHECK BY
60

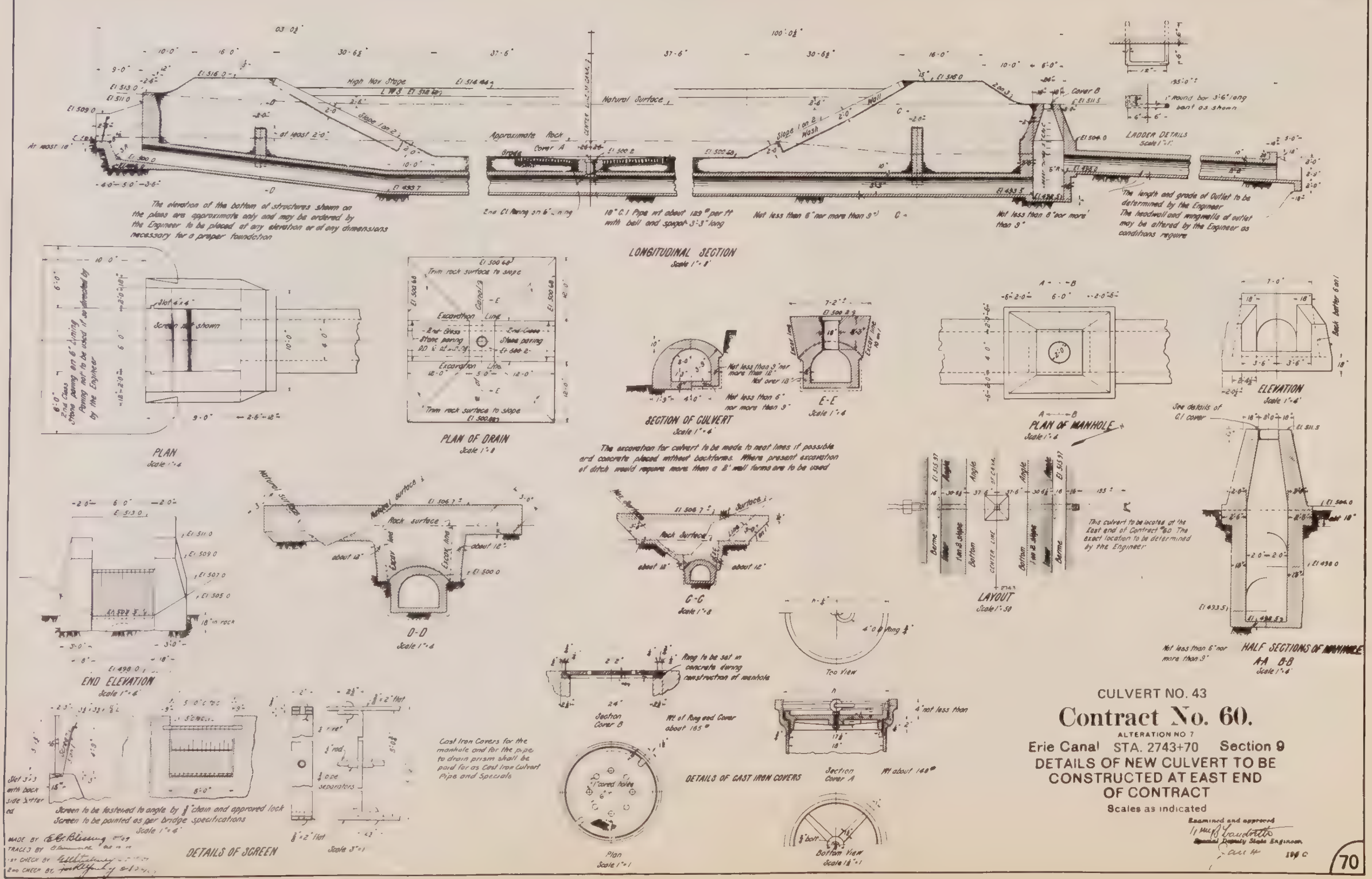
Culvert #43 (Dive) 189' of 4' Wide by 3'3" High Concrete Arch
+ 235' Extension

Entrance
Headwall contained a few cracks, but headwall and wingwalls were generally in good condition.

Canal Area Over Culvert 43
In the Spring of 1976, water was seen spouting up into nearly drained canal. Manhole exit had plugged with debris and water rose 5' over exit or 3' above level of canal water. Pressure caused drain cover at bottom of canal over culvert to blow out. During week of April 26-30, area was sandbagged off, but high water in canal from rains inundated area. Earth cofferdam was then built and mud removed until drain was found.

Extension Exit
Headwall had cracked vertically over top of arch, but the concrete was in good condition. This headwall is some 235' from where the culvert under the canal emerges into a manhole. This extension was in good condition.

Culvert 43 Welded Drain Cover
Tilted drain cover was put back into position and shims put on top of recessed cover. Holes were drilled into existing concrete pad and bolts anchored. Steel plate was placed over cover and angle iron over steel plate. Plate and iron were welded together. Angle iron was welded to anchor bolts.



CULVERT NO. 43

Contract No. 60.

ALTERATION NO 7

Erie Canal STA. 2743+70 Section 9

DETAILS OF NEW CULVERT TO BE CONSTRUCTED AT EAST END OF CONTRACT

Scales as indicated

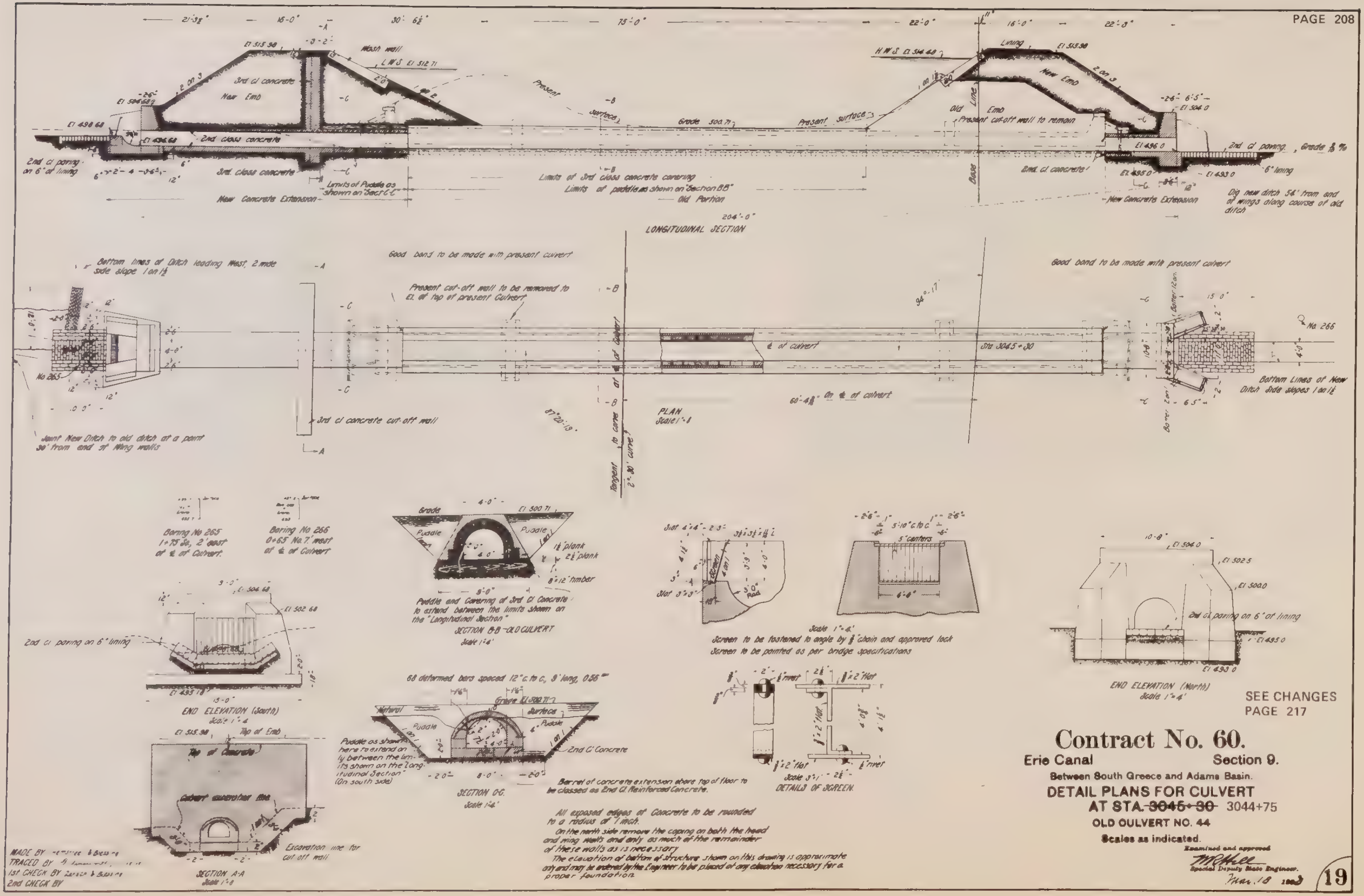
Examined and approved
Special Deputy State Engineer

Culvert #44 132' of 42" Cast Iron Pipe
72.5' of 4' Wide x 3' High Concrete Arch
36' of 36" Corrugated Metal Pipe Recently placed in Culvert Entrance

Entrance
Concrete arch behind headwall failed Area excavated and 3-12' lengths of 36" corrugated metal pipe installed in Spring of 1975. Deteriorated headwall and wingwalls were faced with steel plates.

Exit
Headwall and wingwalls seemed to be patched with mortar. 1' deep erosion at wingwall waterline

From south to north (entrance to exit) - Last section in of corrugated pipe has been cut all along the top, possibly to squeeze pipe to smaller diameter, but there was a 3-4" gap between the pipe and the circular arch wall. Next 10' is concrete arch, 70% of which has scaled areas up to 1' deep. Cast iron pipe then begins. Two 5" diameter holes one on each side of joint between 2nd and 3rd pipe sections, patched with 10" square steel plate. One patch has fallen off (steel plate is on outside also). Between 3rd and 4th sections, roots and 3 constant drip size leaks. Last 15' concrete arch. 1 scaled area 6" deep above the water line and 1 scaled area 3" deep at the water line. Repairs are needed.


LONGITUDINAL SECTION
New Concrete Extension
Old Portion
Limits of 3rd class concrete covering
Limits of puddle as shown on "Section BB"
Present cut-off wall to remain
Dig new ditch 54' from end of wings along course of old ditch
Good bond to be made with present culvert
Present cut-off wall to be removed to El. of top of present Culvert
3rd cl concrete cut-off wall
Joint New Ditch to old ditch at a point 30' from end of Wing walls
Bottom lines of Ditch leading West, 2 wide side slope 1 on 1½
Bottom Lines of New Ditch side slopes 1 on 1½
PLAN
Scale 1"=8'
Tangent to curve at ℄ of Culvert
Boring No 265
Boring No 266
SECTION B-B - OLD CULVERT
Scale 1"=4'
Puddle and Covering of 3rd Cl Concrete to extend between the limits shown on the "Longitudinal Section"
END ELEVATION (South)
SECTION C-C
Scale 1"=4'
SECTION A-A
Screen to be fastened to angle by ⅜" chain and approved lock
Screen to be painted as per bridge specifications
DETAILS OF SCREEN
END ELEVATION (North)
Scale 1"=4'
Barrel of concrete extension above top of floor to be classed as 2nd Cl Reinforced Concrete.
All exposed edges of Concrete to be rounded to a radius of 1 inch.
On the north side remove the coping on both the head and wing walls and only as much of the remainder of these walls as is necessary
The elevation of bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.
SEE CHANGES
PAGE 217
Contract No. 60.
Erie Canal
Section 9.
Between South Greece and Adams Basin.
DETAIL PLANS FOR CULVERT
AT STA. 3045+30 3044+75
OLD CULVERT NO. 44
Scales as indicated.
Examined and approved
Special Deputy State Engineer.
19

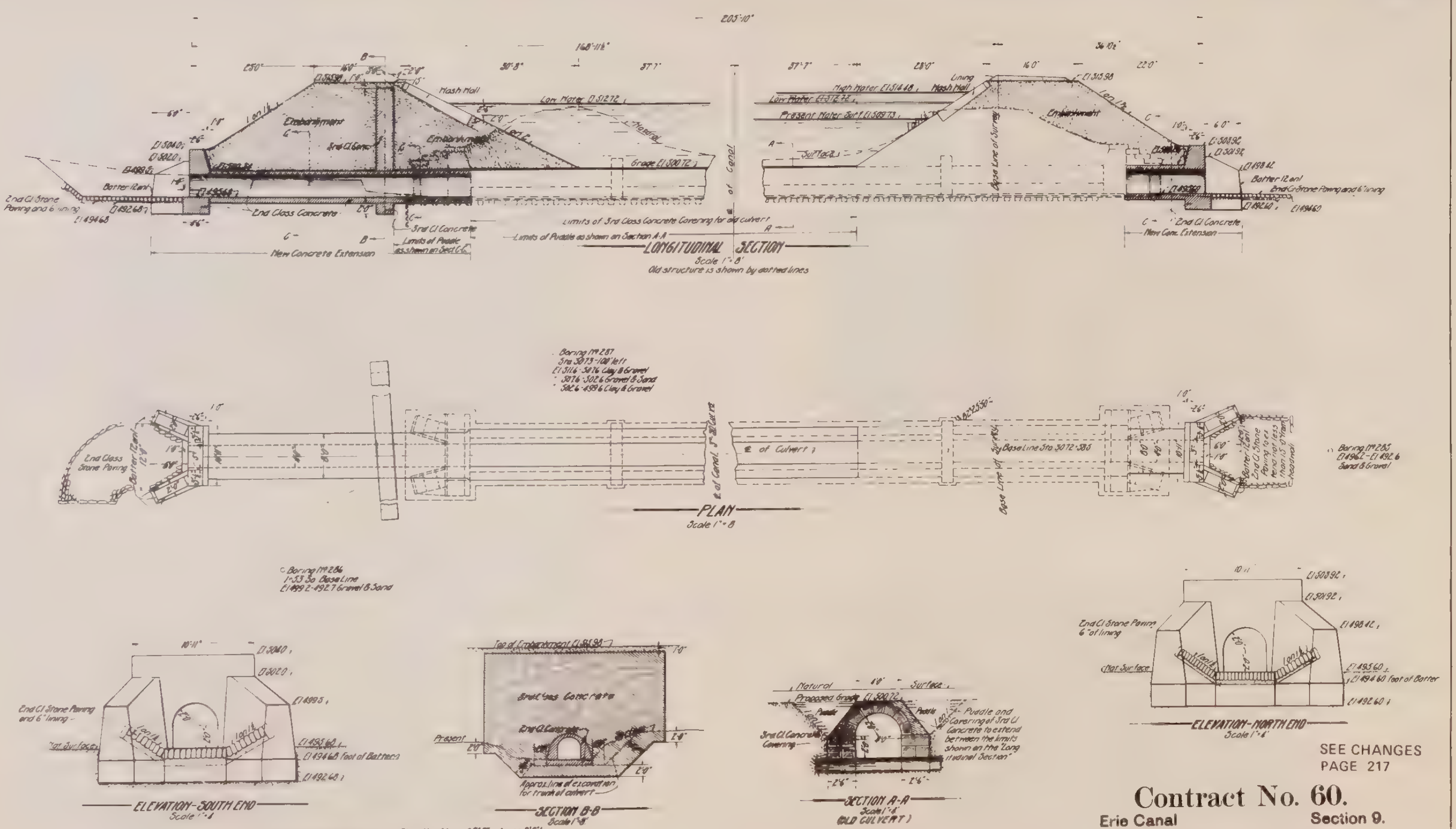
Culvert #45 132' of 48" Cast Iron Pipe
74' of 4' x 4' Concrete Arch

Entrance
Headwall and wingwalls were in good condition. Wingwalls have some surface cracks.

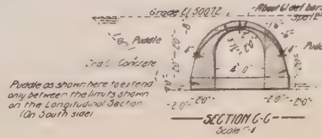
Exit
Headwall was in good condition. Wingwalls were in fair condition with a number of cracks on the surface.

Hole behind entrance headwall filled with rock.

From north to south (exit to entrance) 1st 4 foot section was extensively scaled up to 1' deep. Ground water leakage at 1st joint. Next 10' long and 4' long concrete sections were in good condition. Then cast iron pipe was in good condition. Midpoint in the pipe, there was a 10" square overhead plate patch with water flowing from behind it. 50' from south end, 1st 6' long concrete section was in good condition. 2nd 8' long section had its joint area scaled 1' wide and 6" in depth. All the way around arch, ground water was leaking in. 3rd 8' long section in good condition. Then joint area scaled 1' wide and 3" deep. Last 20' of arch in good condition until headwall reached. Rear 2' of 4' thick headwall badly eroded. A 1' x 4' hole was patched with loose sheet metal. Embankment can be seen behind patch. A 4' wide x 6' long x 3' deep hole filled with rock existed behind the headwall. Repairs are needed.



SEE CHANGES
PAGE 217



NOTES

All paving shown on this sheet to be 2nd Class with 6" lining

The limits of paving and the elevation of the edges to be determined by the Engineer

Edge to be protected by a course of paving stone at least 18" in depth. Payment to be made therefor as second class paving

Barrel of culvert extension above top of floor to be classed as 2nd Cl Reinforced Concrete

NOTES

All concrete shown on this drawing to be 2nd class with the exception of the Cut Off Wall which is to be 3rd class.

All exposed edges of concrete to be rounded to a radius of 1"

A good bond is to be made between the old and new work

On the south side the old headwall and wing walls are to be removed entire

The old cut off wall on the south side to be trimmed flush with the top of the old culvert trunk

— On the north side remove the coping on both the head and wing walls and only as much of the remainder of these walls as is necessary

The elevation of bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation

Contract No. 60.

Erie Canal Section 9.

Between South Greece and Adams Basin.

DETAIL PLANS FOR CULVERT AT STA. 3072+ ~~58~~ 50

OLD CULVERT NO 45

Scales as indicated

Examined and approved

Special Deputy State Engineer.

May 18 1908

20

Culvert #46 206.5' of 5.5' Wide X 4' High Concrete Arch

Not Inspected

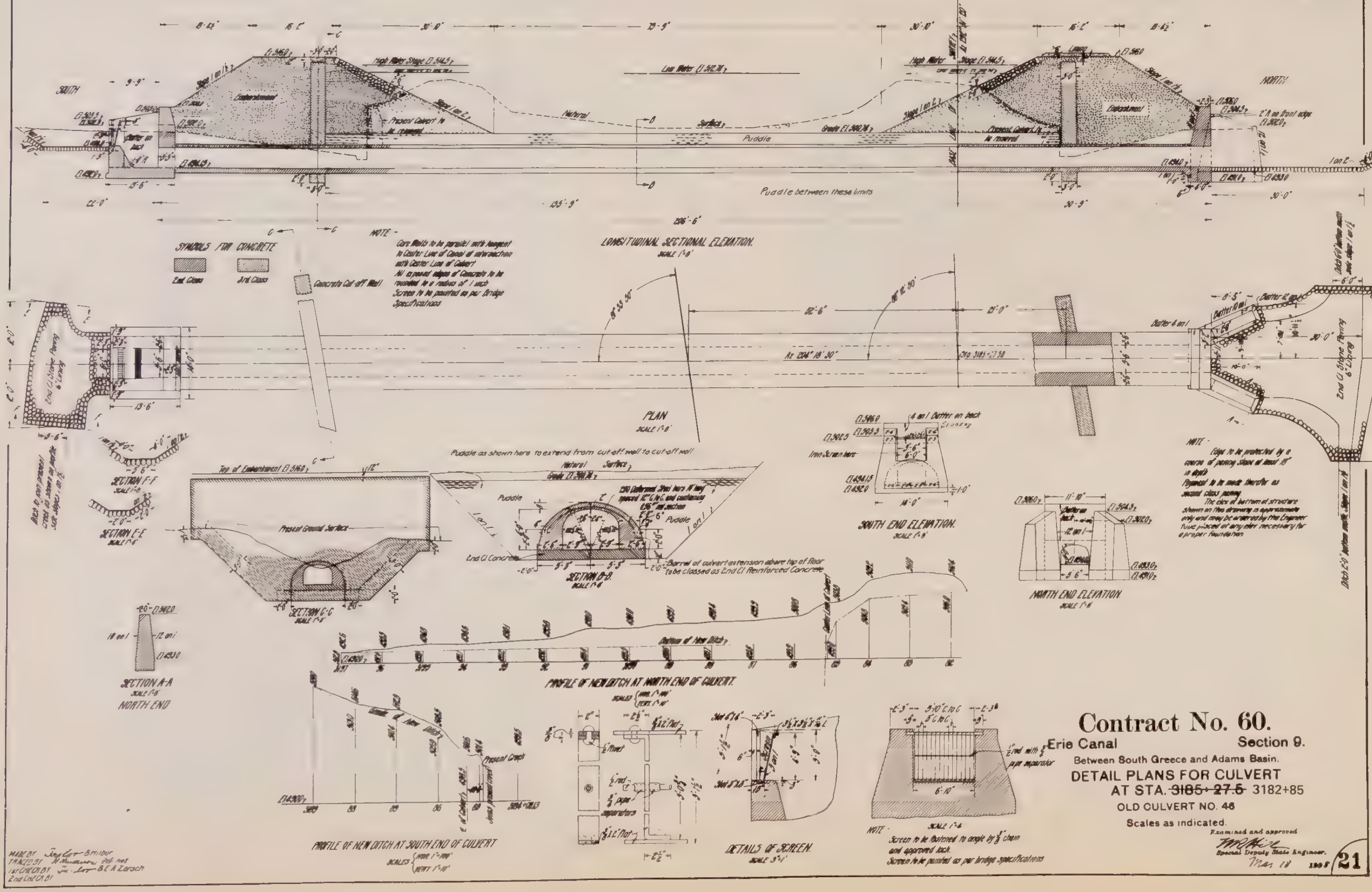
Exit
Headwall in good condition. A few cracks on wingwalls. Culvert exit and channel filled with sand.

Culvert #47 220.5' of 8' Wide x 7' High Concrete Arch

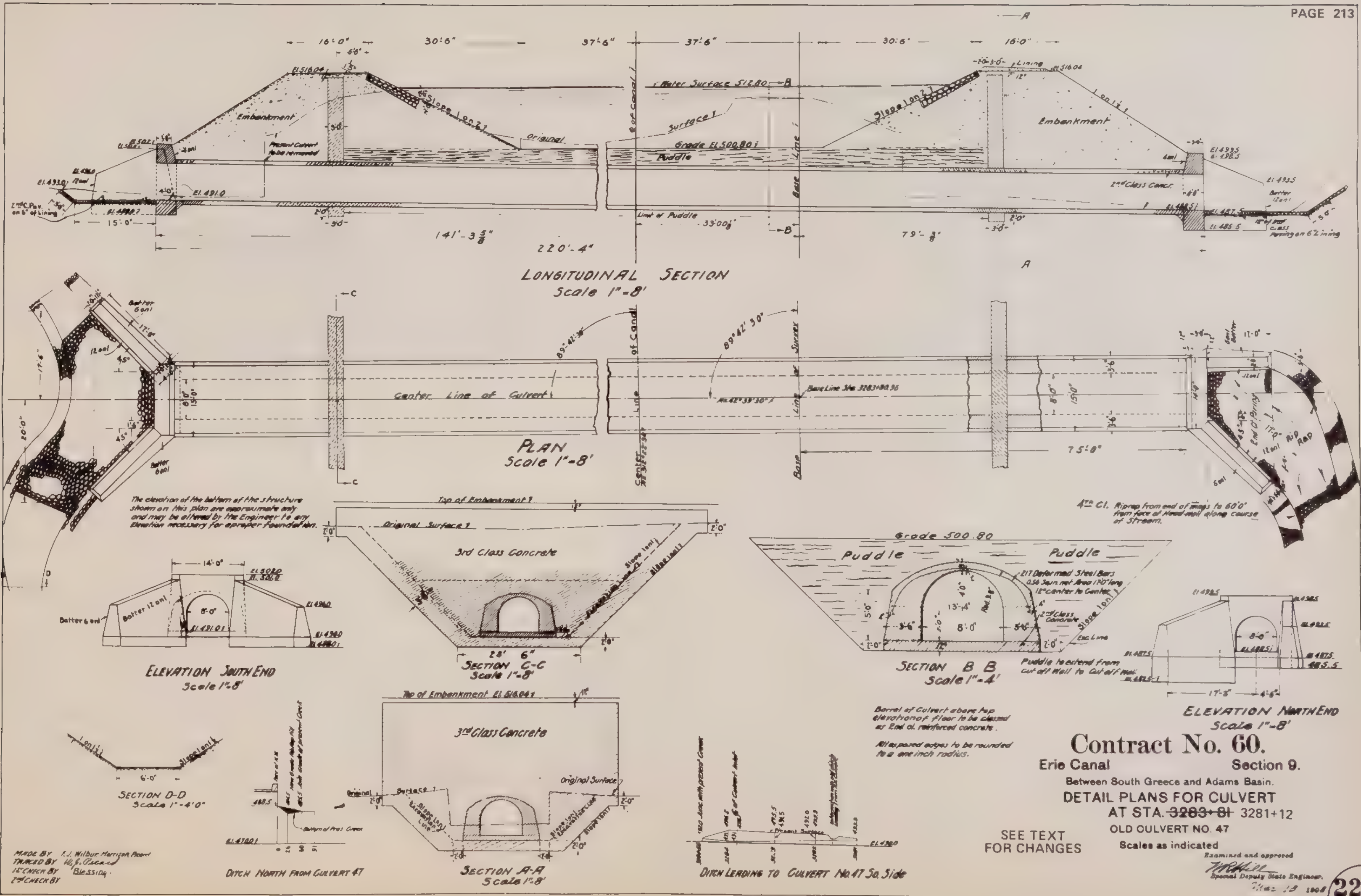
Entrance
Headwall and upper sections of wingwalls cracked, delaminated and covered with efflorescence.

From north to south (exit to entrance) - The 1st joint looked good. 35' from the north end, between 1st and 2nd joint, a crack goes around whole culvert. There was staining present, but no leakage. 2nd joint was stained and leaking. The next 50' section had a crack in the middle and 3 spots that were dripping. There were approximately 6 cracks with heavy efflorescence about 10' from the end of this 50' section. 3rd joint has about 6 steady dripping areas. 4' south of joint was an 8" steel plugged pipe. 4th joint has 3 dripping areas. Cracks toward the middle of this 50' section also dripping. Last section has 2 intermediate cracks that were dripping. Culvert in general was in good condition. Floor was made up of transverse wood timbers with approximately 1' of concrete between the timbers and 1" of concrete cover. Most of the concrete cover near the entrance was missing. A concrete encased sewer pipe was along the west side of the culvert. Approximately 50' from the exit, the culvert slopes up about 1' in 10'. The plans do not show this change.

Exit
Headwall and left wingwall in good condition. Right wingwall had a lot of surface cracks and efflorescence.



LONGITUDINAL SECTIONAL ELEVATION.
SYMBOLS FOR CONCRETE
2nd Class
3rd Class
Concrete Cut-off Wall
Puddle between these limits
PLAN
Puddle as shown here to extend from cut-off wall to cut-off wall
SECTION F-F
SECTION E-E
SECTION C-C
SECTION D-D
SOUTH END ELEVATION.
NORTH END ELEVATION.
SECTION A-A
NORTH END
PROFILE OF NEW DITCH AT NORTH END OF CULVERT.
PROFILE OF NEW DITCH AT SOUTH END OF CULVERT
DETAILS OF SCREEN.
Contract No. 60.
Erie Canal
Section 9.
Between South Greece and Adams Basin.
DETAIL PLANS FOR CULVERT
AT STA. ~~3185+27.5~~ 3182+85
OLD CULVERT NO. 46
Scales as indicated.
Examined and approved
Special Deputy State Engineer.
21



Contract No. 60.

Erie Canal — Section 9.

Between South Greece and Adams Basin.

DETAIL PLANS FOR CULVERT AT STA. ~~3283+81~~ 3281+12

OLD CULVERT NO. 47

Scales as indicated

Examined and approved

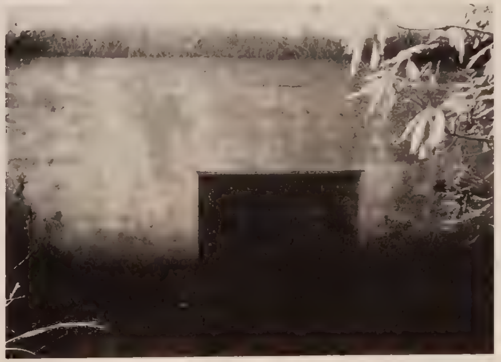
Special Deputy State Engineer.

Culvert #48 (Dive) 216' of 36" Cast Iron Pipe
Not Inspected

Exit

Some scaling on headwall and top of wingwalls, but in good condition. The culvert was not originally built as a dive. Apparently, this work was done to widen the overhead road in 1955 (date on headwall). The 6' X 6' concrete box goes in 10' to a debris filled well.

Culvert #49 136.5' of 42" Cast Iron Pipe
102.5' of 4' Wide X 3' High Concrete Arch



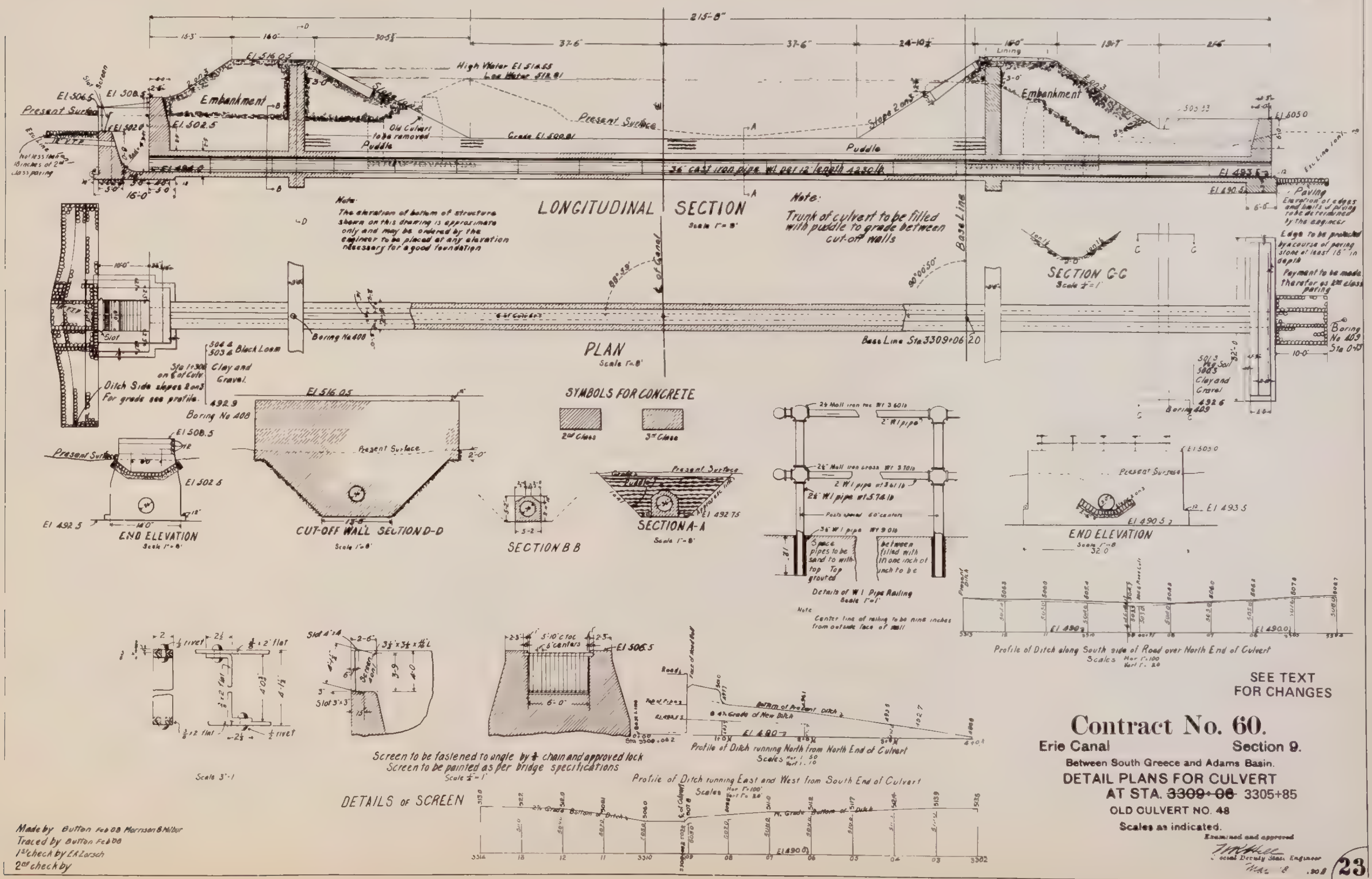
Exit

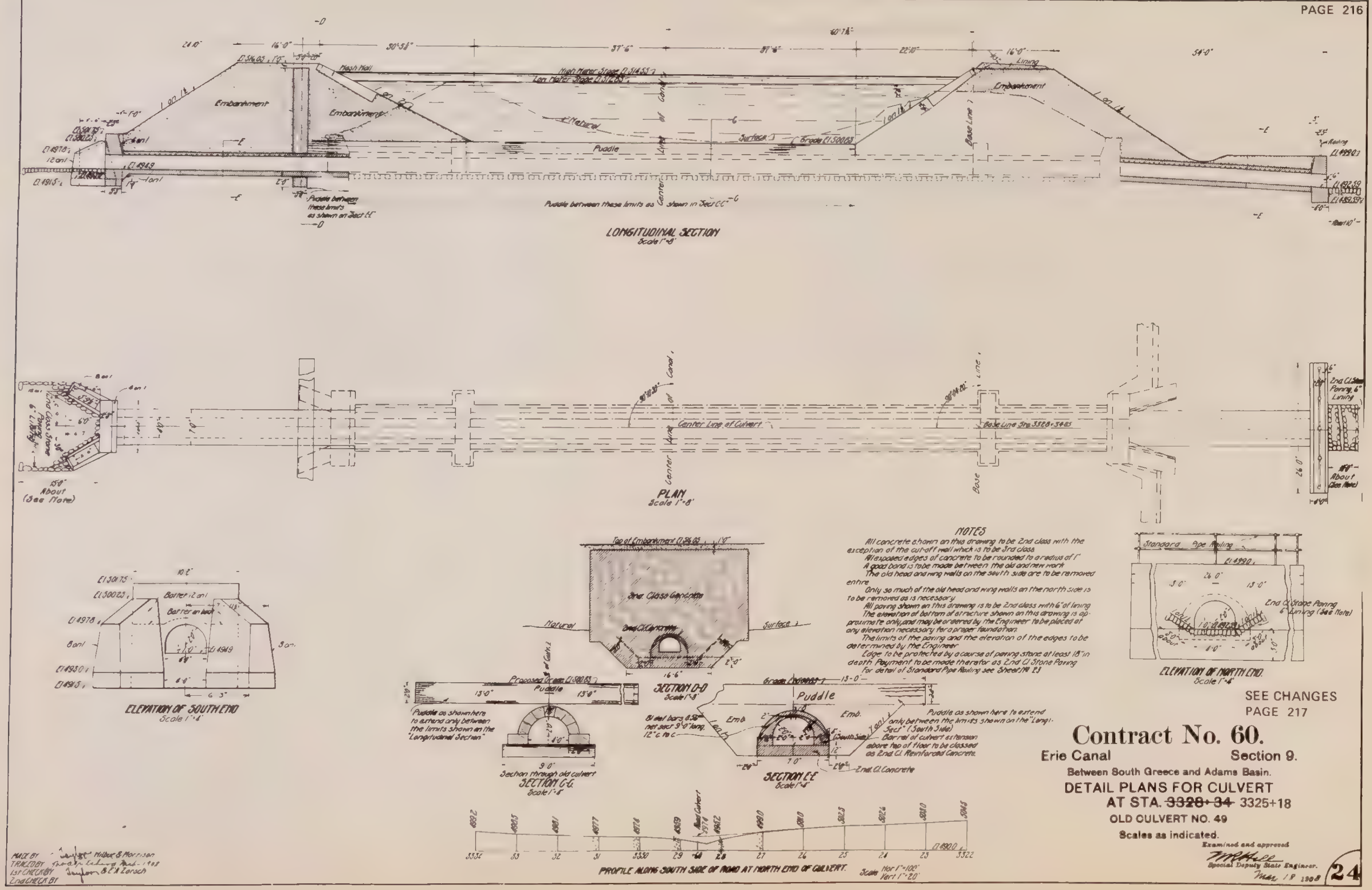
Some headwall surface scaling, but in good condition. Roadway apparently widened in 1955 and culvert extended.

Entrance

Headwall was in very poor condition with a vertical crack through it. Also, there was a 4' wide by 2' high by 8" deep face area missing. Only the top 1½' of headwall was intact. Wingwalls were in fair to poor condition.

From north to south (exit to entrance) - 5' wide by 4' high by 20' long new concrete box in good condition. Next is a 4' high, 5' wide concrete arch. A 1" gap exists between the two. 5' into the arch, there was a scaled area 1' wide, 2' long and 8" deep. 15' into the arch, a 1-1½' wide by 8-12" deep scaled joint area was leaking heavily. 20' into the arch, there was a 1' by 2' by 8" deep scaled area. Next joint leaks, but no deep scaling. 8' from beginning of cast iron pipe was a dripping area. Adjacent to cast iron pipe was a scaled area 3' X 1' X 8" deep. Cast iron pipe has an 18" drain at the center. Slow seepage in cast iron pipe joints, but pipe was in good condition. The concrete arch at the south end of the culvert has approximately 6 scaled areas 8"-1' in depth and ranging in size from 2-6 square feet. Repairs are needed.


215'-8"
37'-6"
37'-6"
24'-10½"
High Water El 514.65
Low Water 512.81
Embankment
Present Surface
Slot
Screen
El 506.5
El 508.5
El 502.5
Old Culvert to be removed
Grade El 500.81
Puddle
Slope 2 on 3
36" cast iron pipe wt per 12' length 4230 lb
El 493.5
El 490.5
Paving
LONGITUDINAL SECTION
Scale 1"= 8'
Note:
The elevation of bottom of structure shown on this drawing is approximate only and may be ordered by the engineer to be placed at any elevation necessary for a good foundation
Note:
Trunk of culvert to be filled with puddle to grade between cut-off walls
Base Line
℄ of Canal
SECTION C-C
Scale ½"=1'
Edge to be protected by course of paving stone at least 16" in depth
Payment to be made therefor as 2nd class paving
Boring No 408
Base Line Sta 3309+06.20
PLAN
Scale 1"=8'
Boring No 409
Black Loam
Clay and Gravel
Ditch Side slopes 2 on 3
For grade see profile
492.9
Boring No 408
El 516.05
SYMBOLS FOR CONCRETE
2nd Class
3rd Class
El 508.5
Present Surface
El 502.5
El 492.5
END ELEVATION
Scale 1"=8'
CUT-OFF WALL SECTION D-D
Scale 1"=8'
SECTION B B
SECTION A-A
Scale 1"=8'
El 492.75
Puddle
Details of W I Pipe Railing
Scale 1"=1'
Note
Center line of railing to be nine inches from outside face of wall
El 505.0
Present Surface
El 493.5
El 490.5
END ELEVATION
Scale 1"=8'
Profile of Ditch along South side of Road over North End of Culvert
El 490.0
El 506.5
Screen to be fastened to angle by ⅜ chain and approved lock
Screen to be painted as per bridge specifications
Scale ½"=1'
Scale 3"=1'
DETAILS of SCREEN
Profile of Ditch running North from North End of Culvert
El 490
Profile of Ditch running East and West from South End of Culvert
El 490.0
Made by Button Feb 08 Morrison & Wilbur
Traced by Button Feb 08
1st check by E.K. Zorsch
2nd check by
SEE TEXT FOR CHANGES
Contract No. 60.
Erie Canal
Section 9.
Between South Greece and Adams Basin.
DETAIL PLANS FOR CULVERT
AT STA. 3309+06 3305+85
OLD CULVERT NO. 48
Scales as indicated.
Examined and approved
Division Deputy State Engineer
23



SEE CHANGES PAGE 217

Contract No. 60.

Erie Canal — Section 9.

Between South Greece and Adams Basin.

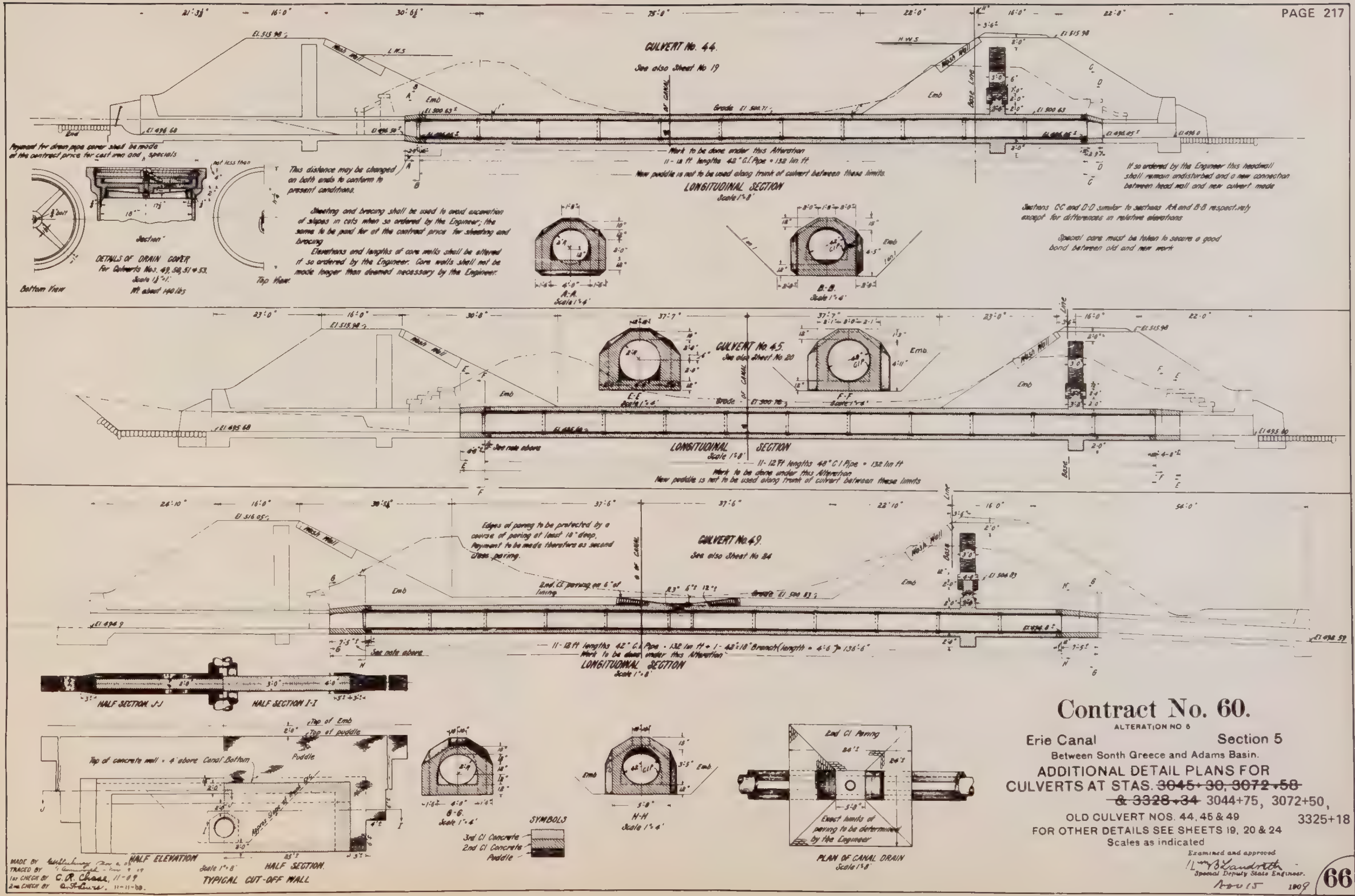
DETAIL PLANS FOR CULVERT AT STA. ~~3328+34~~ 3325+18

OLD CULVERT NO. 49

Scales as indicated.

Examined and approved
Special Deputy State Engineer.
Mar 19 1908

24



Contract No. 60.

ALTERATION NO 8

Erie Canal — Section 5

Between Sonth Greece and Adams Basin.

ADDITIONAL DETAIL PLANS FOR CULVERTS AT STAS. ~~3045+30, 3072+58 & 3328+34~~ 3044+75, 3072+50, 3325+18

OLD CULVERT NOS. 44, 45 & 49

FOR OTHER DETAILS SEE SHEETS 19, 20 & 24

Scales as indicated

Examined and approved

Special Deputy State Engineer.

Nov 15 1909

MADE BY
TRACED BY
1st CHECK BY C. R. Chase, 11-09
2nd CHECK BY

Culvert #50 148.5' of 42" Cast Iron Pipe
73' of 4' Wide X 3' High Concrete Arch

Exit

New headwall built in 1955 due to road widening. Top of headwall was scaling away and 1 section of reinforcing steel exposed.

Entrance

Headwall in fair condition. Left side contained deep scale. Left wingwall in poor condition. Joint between left wingwall and headwall scaled up to 1' in depth.

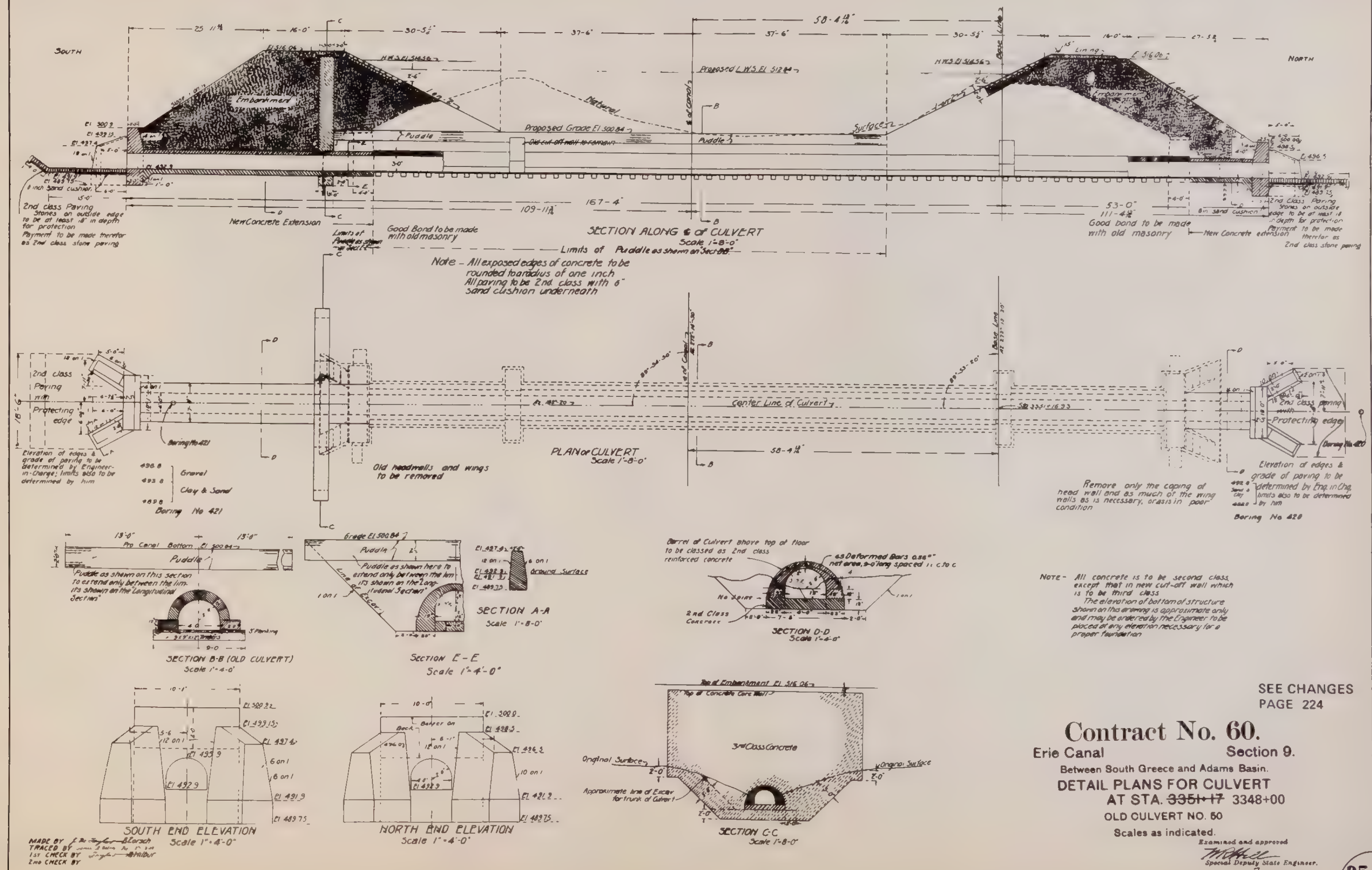
From south to north (entrance to exit) - 1st joint (behind headwall) scaled 6"-1' in depth. 2nd joint was scaled 8" deep and had slow seepage. Next 2 joints have slow leakage, but no scaling. Some joints in cast iron pipe contained some seepage, but pipe was in good condition. 2nd joint in the concrete arch (north end) has some dripping. A crack exists in the center of the arch between joints. Drain in top of culvert on south side of road.

Culvert #51 136.5' of 42" Cast Iron Pipe
82' of 4' Wide X 3' High Conc. Arch
Not Inspected

Exit

Headwall cracked 1' below top where concrete was covered with efflorescence. Wingwalls in good condition. Outlet area was all silted in. Little or no water flow.

Exposed sheet piling on south embankment. Widewater area is at right. The south end of this culvert was plugged prior to creating the widewater area. See Introduction Canal Culverts.



SEE CHANGES
PAGE 224

Contract No. 60.

Erie Canal Section 9.

Between South Greece and Adams Basin.

DETAIL PLANS FOR CULVERT AT STA. ~~3351+17~~ 3348+00

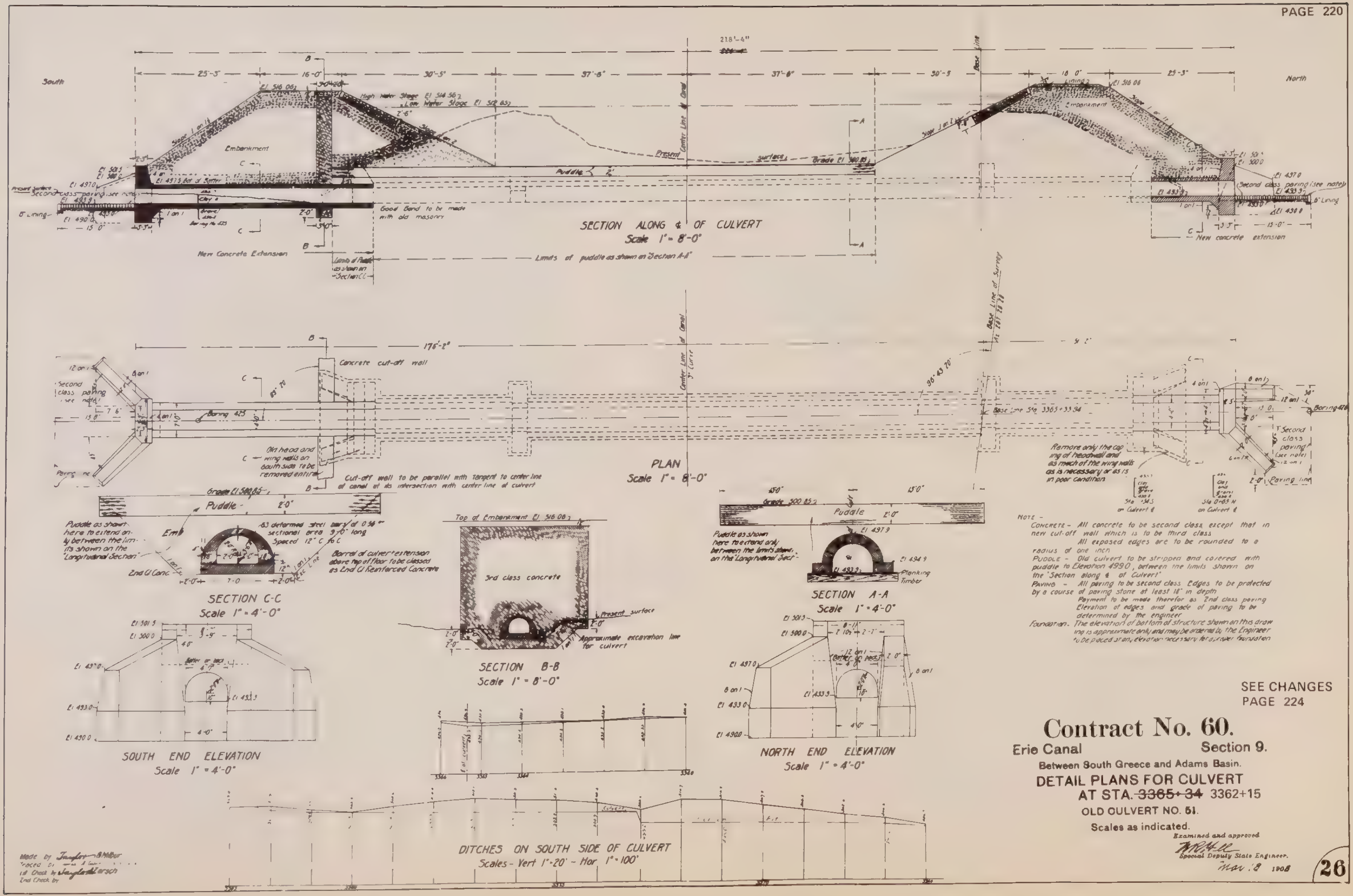
OLD CULVERT NO. 60

Scales as indicated.

Examined and approved

Special Deputy State Engineer.

Mar 18 1908


218'-4"
South
North
High Water Stage El 514.56
Low Water Stage El 512.85
Embankment
Present surface
Puddle
Grade El 500.85
Center Line of Canal
Base Line
New Concrete Extension
Good Bond to be made with old masonry
SECTION ALONG ¢ OF CULVERT
Scale 1" = 8'-0"
Limits of puddle as shown on Section A-A
New concrete extension
176'-2"
Concrete cut-off wall
Old head and wing walls on south side to be removed entire
Cut-off wall to be parallel with tangent to center line of canal at its intersection with center line of culvert
PLAN
Scale 1" = 8'-0"
Remove only the coping of headwall and as much of the wing walls as is necessary or as is in poor condition
Second class paving (see note)
Puddle as shown here to extend only between the limits shown on the "Longitudinal Section"
Barrel of culvert extension above top of floor to be classed as 2nd Cl Reinforced Concrete
SECTION C-C
Scale 1" = 4'-0"
Top of Embankment El 516.06
3rd class concrete
Present surface
Approximate excavation line for culvert
SECTION B-B
Scale 1" = 8'-0"
Puddle as shown here to extend only between the limits shown on the Longitudinal Sect
Planking Timber
SECTION A-A
Scale 1" = 4'-0"
NOTE -
CONCRETE - All concrete to be second class except that in new cut-off wall which is to be third class. All exposed edges are to be rounded to a radius of one inch.
PUDDLE - Old culvert to be stripped and covered with puddle to Elevation 499.0, between the limits shown on the "Section along ¢ of Culvert".
PAVING - All paving to be second class. Edges to be protected by a course of paving stone at least 18" in depth. Payment to be made therefor as 2nd class paving. Elevation of edges and grade of paving to be determined by the engineer.
FOUNDATION - The elevation of bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.
SOUTH END ELEVATION
Scale 1" = 4'-0"
NORTH END ELEVATION
Scale 1" = 4'-0"
DITCHES ON SOUTH SIDE OF CULVERT
Scales - Vert 1" = 20' - Hor 1" = 100'
SEE CHANGES PAGE 224
Contract No. 60.
Erie Canal
Section 9.
Between South Greece and Adams Basin.
DETAIL PLANS FOR CULVERT
AT STA. 3365+34 3362+15
OLD CULVERT NO. 51.
Scales as indicated.
Examined and approved
Special Deputy State Engineer.
May 18 1908
26

Culvert #52 210.5' of 4' X 4' Concrete Box

Not Inspected

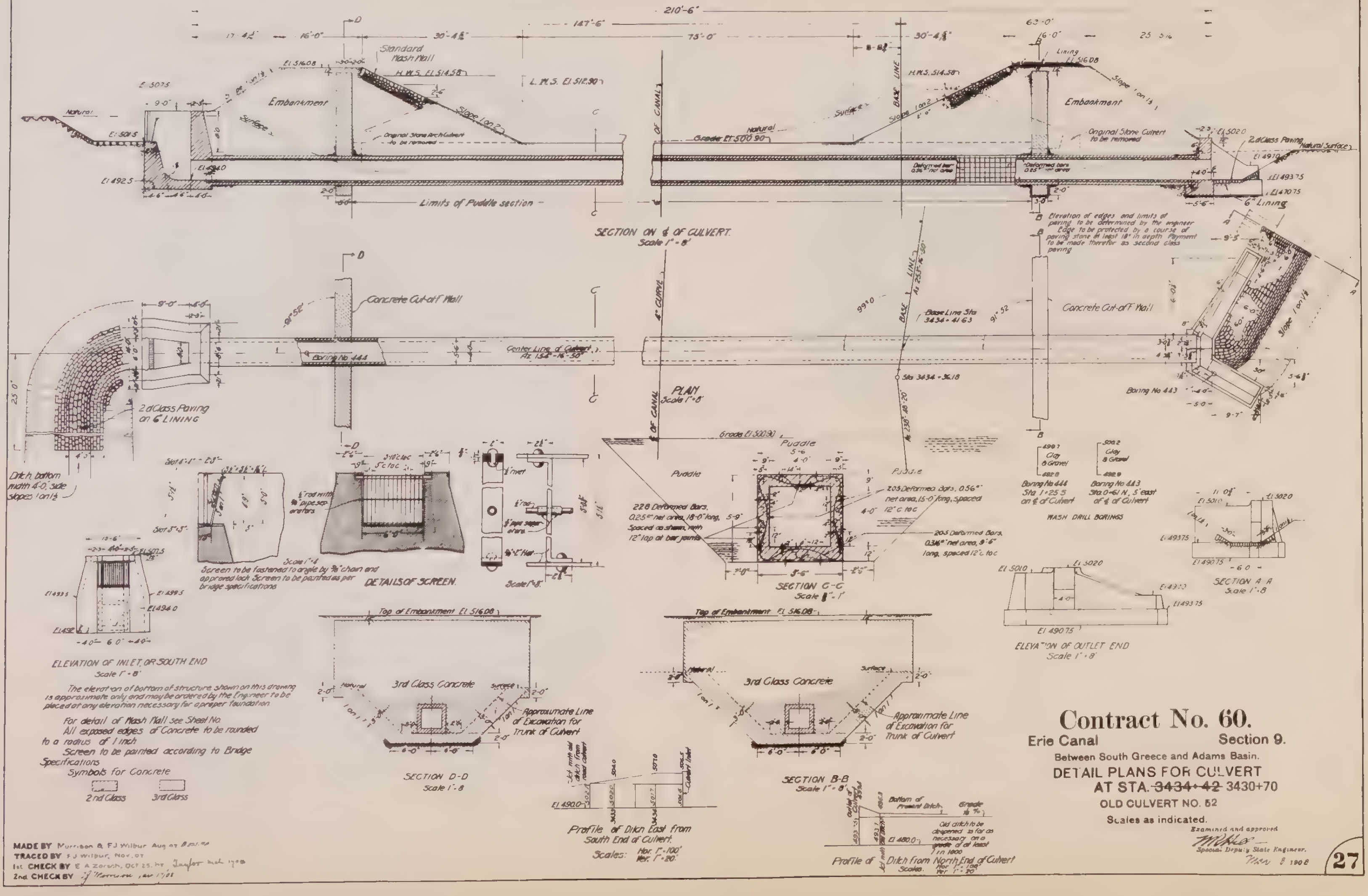
Exit
Headwall and right wingwall in good condition. Left wingwall in poor condition. Horizontal cracks scaled 1½' wide and up to 1' deep. Outlet ditch silted in.

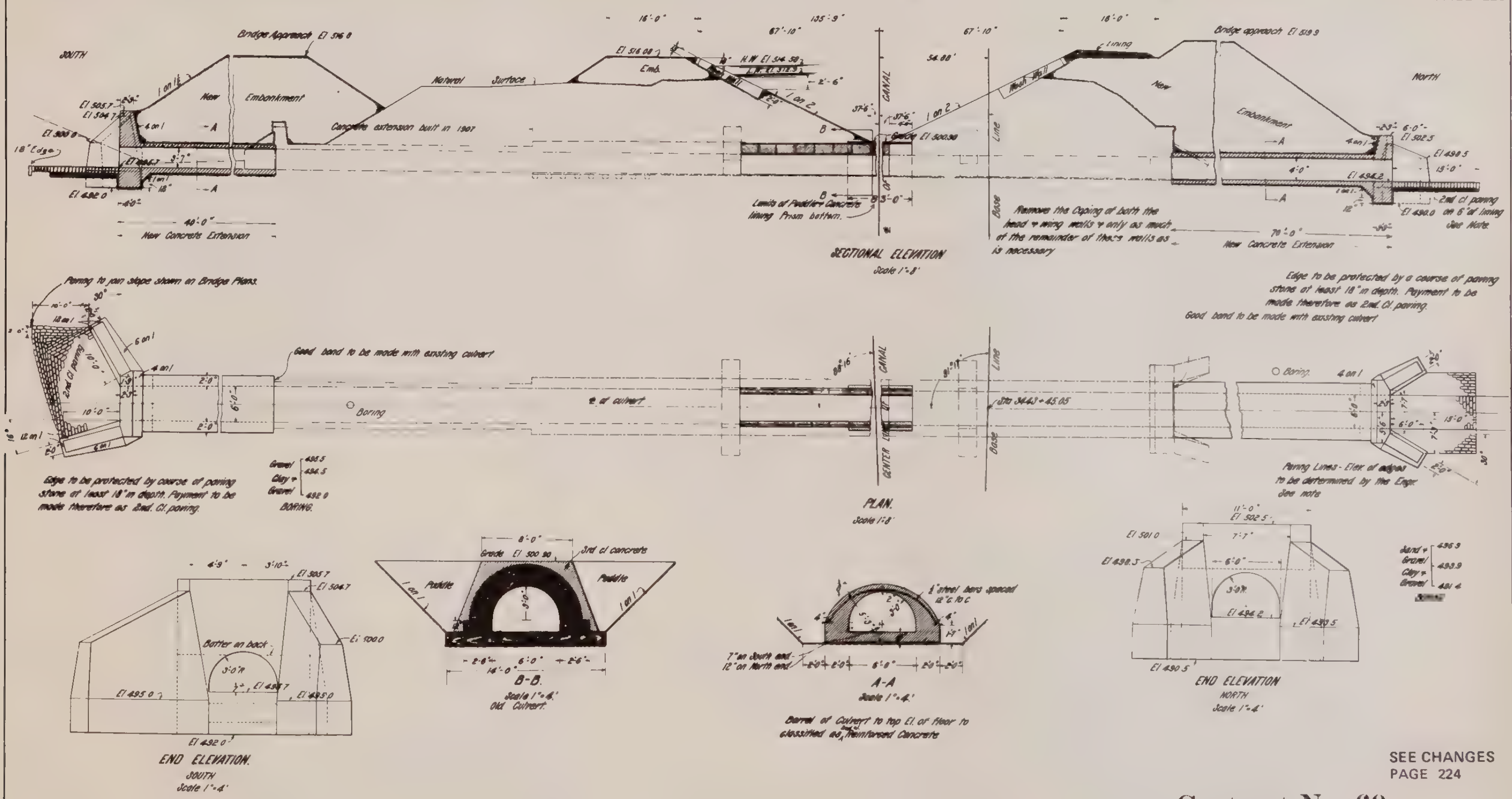
Culvert #53 172.5' of Twin 42" Cast Iron Pipe
165.5' of 6' Wide X 3.5' High Concrete Arch

Exit
Headwall and wingwalls were in good condition. They appear to have been coated with mortar. Some surface cracking on the right wingwall.

Entrance
Headwall and wingwalls in good condition.

From north to south (exit to entrance) - Some seepage through joints in 60' long concrete arch. Both cast iron pipes had some seepage through all joints. 1st joint south of cast iron pipe, hole in ceiling (plugged drain) had steady dripping. 2nd and 3rd joints from twin cast iron pipes had steady leaking. 30' from the south end, on the east side of the culvert, there was a 1 square foot hole (gravel and water washing in, roadway overhead). 20' from the south end, on the west side, there was a scaled hole 2' in diameter and 1' in depth. Starting 3' in from entrance headwall to approximately 12' in on the west side, scaling 1' deep and 1' wide. 3-4" of scaling at joint between headwall and concrete arch.


SECTION ON ¢ OF CULVERT.
Scale 1" = 8'
Embankment
Limits of Puddle section
PLAN
Scale 1" = 8'
Concrete Cut-off Wall
Center Line of Culvert
Boring No 444
Boring No 443
2d Class Paving on 6" LINING
Ditch, bottom width 4'-0", side slopes 1 on 1½
DETAILS OF SCREEN.
Screen to be fastened to angle by ⅜" chain and approved lock. Screen to be painted as per bridge specifications.
SECTION C-C
WASH DRILL BORINGS
SECTION A-A
Scale 1" = 8
ELEVATION OF OUTLET END
Scale 1" = 8'
ELEVATION OF INLET, OR SOUTH END
Scale 1" = 8'
The elevation of bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.
For detail of Wash Wall see Sheet No.
All exposed edges of Concrete to be rounded to a radius of 1 inch.
Screen to be painted according to Bridge Specifications.
Symbols for Concrete
2nd Class
3rd Class
Top of Embankment El 516.08
3rd Class Concrete
Approximate Line of Excavation for Trunk of Culvert
SECTION D-D
Scale 1" = 8
SECTION B-B
Scale 1" = 8'
Profile of Ditch East from South End of Culvert.
Scales: Hor. 1" = 100' Ver. 1" = 20'
Profile of Ditch from North End of Culvert
Contract No. 60.
Erie Canal
Section 9.
Between South Greece and Adams Basin.
DETAIL PLANS FOR CULVERT
AT STA. ~~3434+42~~ 3430+70
OLD CULVERT NO. 52
Scales as indicated.
Examined and approved
Special Deputy State Engineer.
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
27



SEE CHANGES
PAGE 224

Contract No. 60.

Erie Canal Section 9.

Between South Greece and Adams Basin.

DETAIL PLANS FOR CULVERT
AT STA. ~~3443+45~~ 3440+00

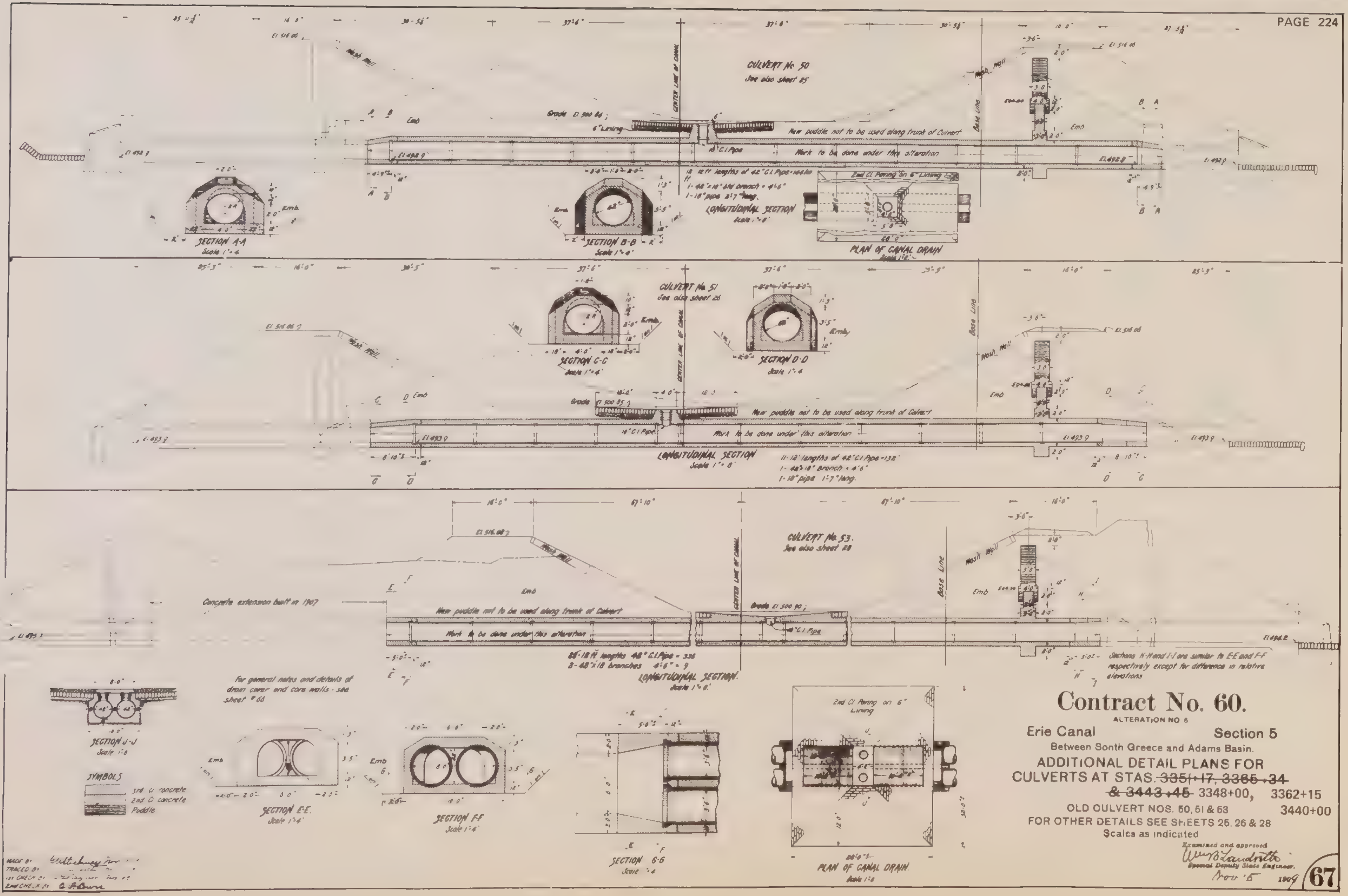
OLD CULVERT NO. 63

Scales as indicated.

MADE BY Taylor & Morrison
TRACED BY
1st CHECK BY Taylor & Marsh
2nd CHECK BY

Examined and approved
Special Deputy State Engineer.
Mar 18 1908

28



Contract No. 60.

ALTERATION NO 5

Erie Canal — Section 5

Between South Greece and Adams Basin.

ADDITIONAL DETAIL PLANS FOR CULVERTS AT STAS. ~~3351+17, 3365+34 & 3443+45~~ 3348+00, 3362+15, 3440+00

OLD CULVERT NOS. 50, 51 & 53

FOR OTHER DETAILS SEE SHEETS 25, 26 & 28

Scales as indicated

Examined and approved

Wm B Landreth

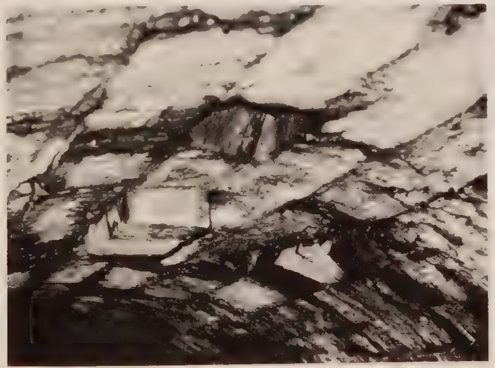
Special Deputy State Engineer.

Nov 5 1909

Culvert #54 124' of Twin 12' Wide X 6'7" High Stone Block Arch and 78' of Concrete Arch

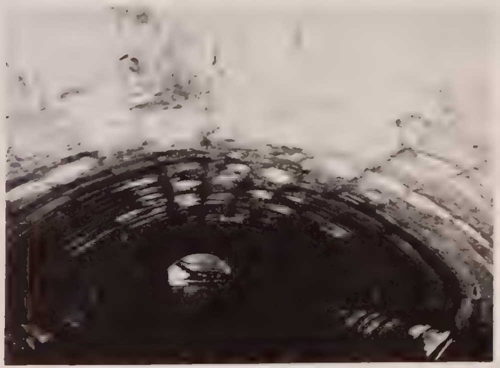
Entrance
Headwall and wingwall areas contained a number of small cracks, but concrete generally in fair to good condition.

Exit
Headwall and wingwall areas contained a number of small cracks, but concrete generally in fair to good condition.

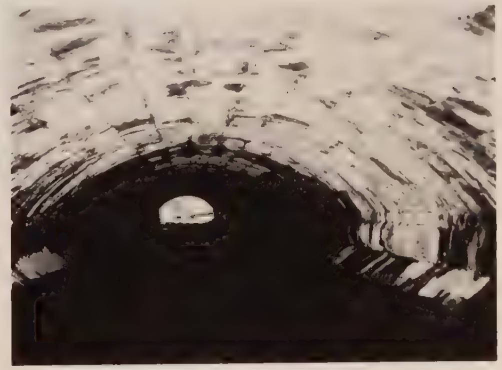


West Barrel - Partially Missing and Slipped Blocks, Looking South

West Barrel - Partially Missing and Slipped Blocks, Looking North

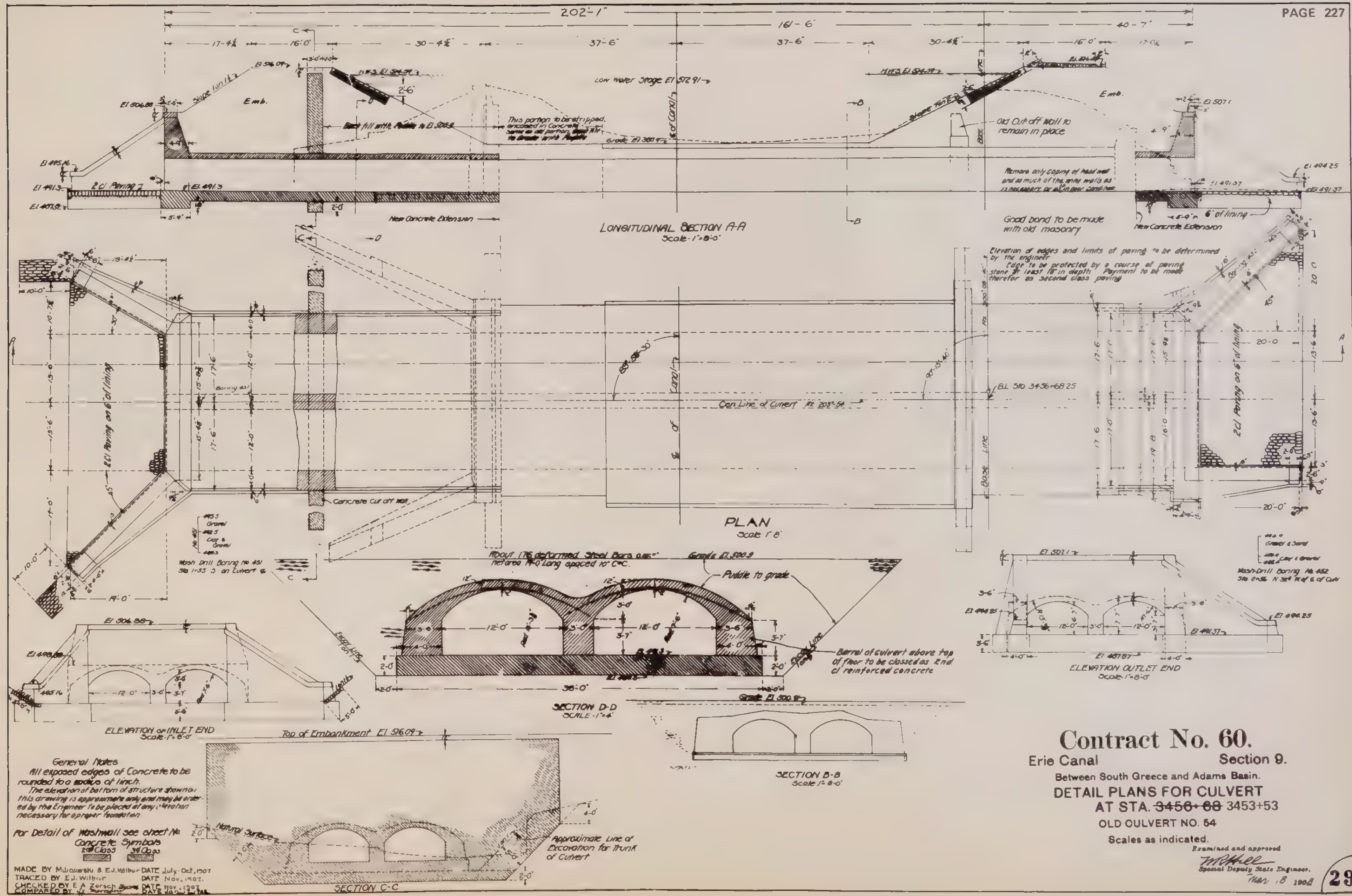


East Barrel - Looking South
Continuous dripping throughout. Heaviest leakage area was near the center around a cracked stone block (series of drip size streams). Concrete arches generally in good condition.



West Barrel - Looking South
Continuous dripping throughout. South end (80') was concrete (40' concrete arch and 40' of stone block arch lining). Arch lining contained numerous efflorescent covered cracks. One stone block near the center has slipped down 5". Also 6 partially broken stone blocks near center and 3 of these have holes up to 1½' deep. Stone block joints adjacent to north headwall open 1" wide and 1' deep or more. Concrete arches generally in good condition.

Both barrels need repair.



General Notes

All exposed edges of Concrete to be rounded to a radius of 1 inch.

The elevation of bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.

For Detail of Washwall see sheet No.

Concrete Symbols: 2nd Class, 3rd Class

MADE BY M. Bouwsely & E.J. Wilbur DATE July-Oct. 1907
TRACED BY E.J. Wilbur DATE Nov. 1907.
CHECKED BY E.A. Zorsch DATE Nov. 1907
COMPARED BY DATE

Contract No. 60.

Erie Canal — Section 9.

Between South Greece and Adams Basin.

DETAIL PLANS FOR CULVERT AT STA. ~~3456+68~~ 3453+53

OLD CULVERT NO. 54

Scales as indicated.

Examined and approved
Special Deputy State Engineer.
Mar. 18 1908

Culvert #55 (Dive)

197' of 8' Wide X 5' High Concrete Arch
Not Inspected

Exit

Headwall in good condition. Ends of both wingwalls fractured and starting to fall apart. Right wingwall has broken loose from headwall. Two steel beam braces prevent right wingwall from moving inward. 5 syphons.

Culvert #55½ (Dive)

235' of 2' Wide X 1.5' High Concrete Box
Not Inspected

Exit

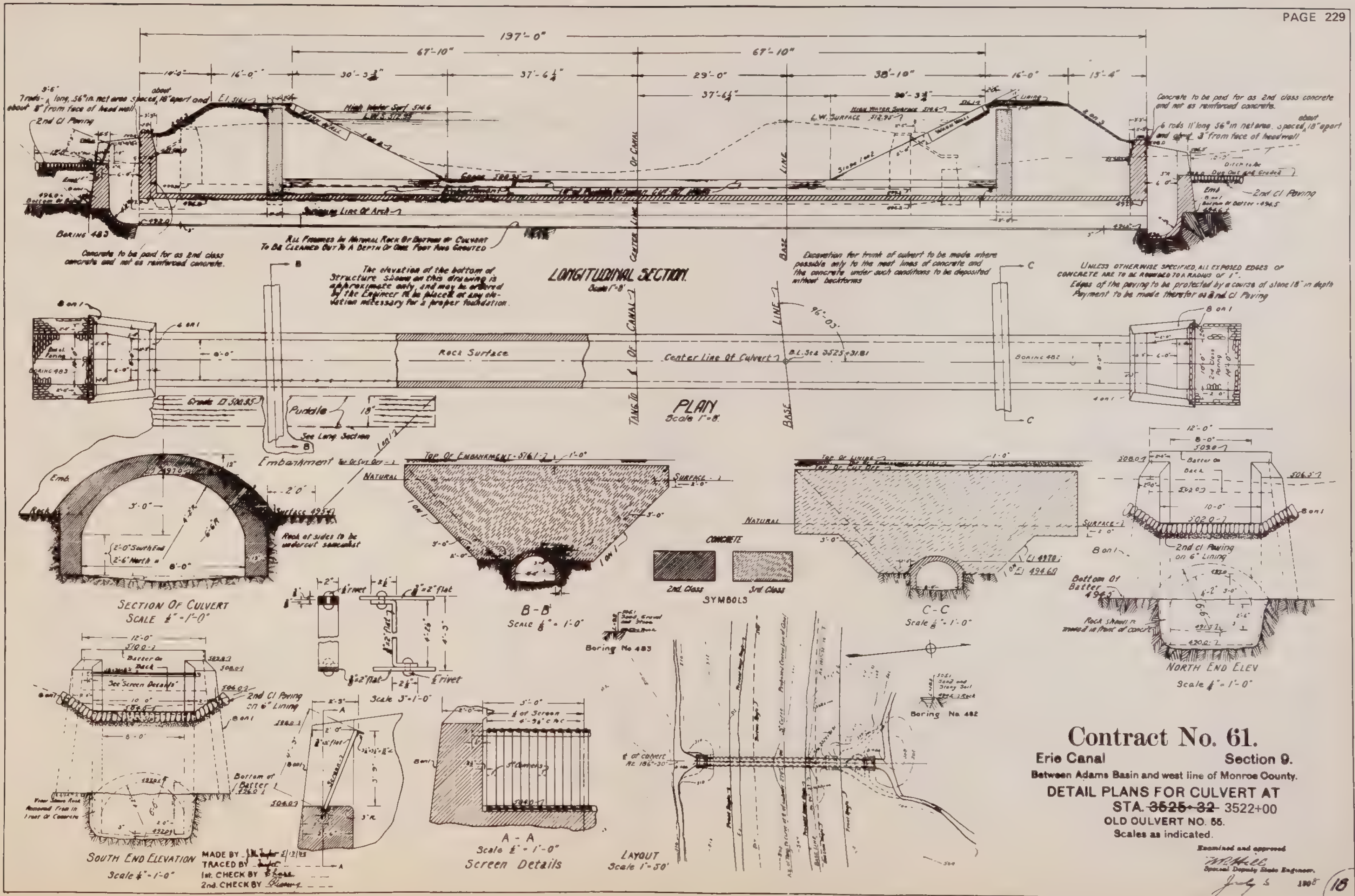
Headwall and wingwalls in good condition. 4-3" syphons, 2 were active.

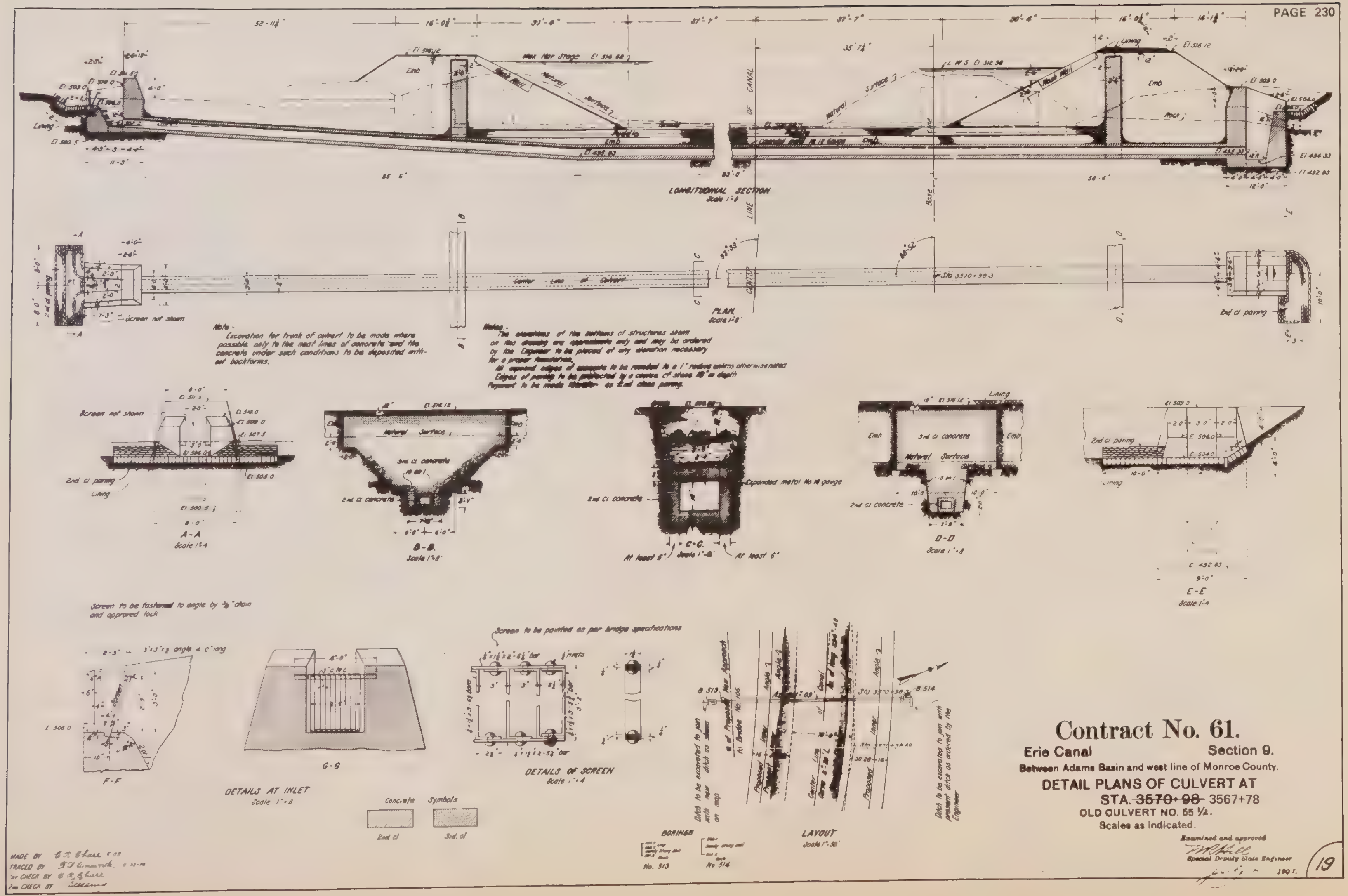
Culvert #56 (Dive)

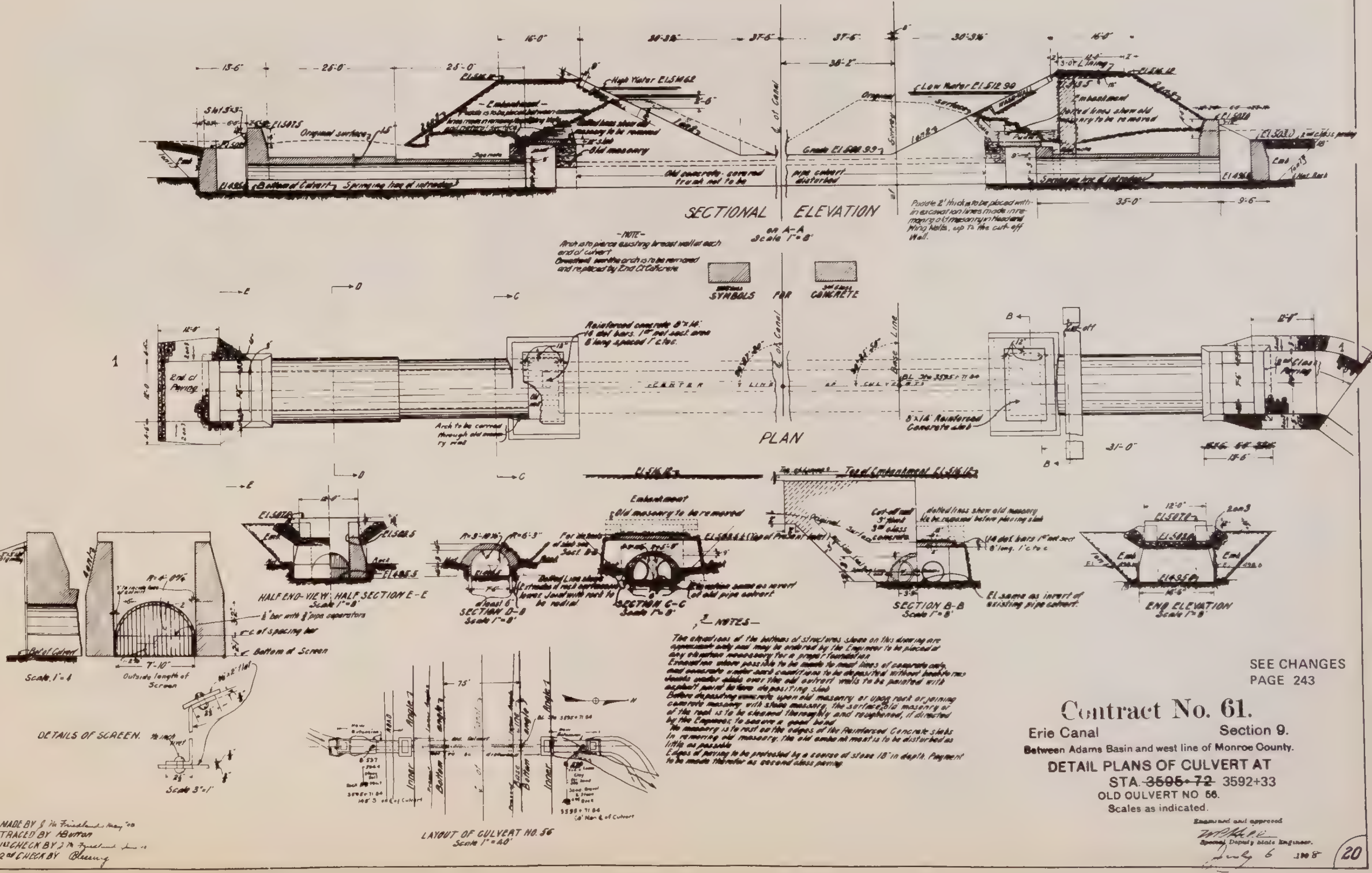
130' of Twin 48" Cast Iron Pipe
90' of 7.5' Wide X 5' High Concrete Arch
11' of 12' Wide X 8' High Concrete Slab
Not Inspected

Exit

Headwall and wingwalls in good condition. 10" and 4" syphon.


197'-0"
67'-10"
67'-10"
LONGITUDINAL SECTION
PLAN
Scale 1"=8'
Rock Surface
Center Line Of Culvert
Concrete to be paid for as 2nd class concrete and not as reinforced concrete.
The elevation of the bottom of structure shown on this drawing is approximate only, and may be altered by the Engineer to be placed at any elevation necessary for a proper foundation.
Excavation for trunk of culvert to be made where possible only to the neat lines of concrete and the concrete under such conditions to be deposited without backforms
Unless otherwise specified, all exposed edges of concrete are to be rounded to a radius of 1".
Edges of the paving to be protected by a course of stone 18" in depth. Payment to be made therefor as 2nd Cl Paving
Section Of Culvert
Scale ½"-1'-0"
B-B
Scale ⅛"=1'-0"
CONCRETE
2nd Class
3rd Class
SYMBOLS
C-C
Scale ⅛"-1'-0"
North End Elev
Scale ¼"=1'-0"
South End Elevation
Scale ¼"-1'-0"
A - A
Scale ¼"-1'-0"
Screen Details
Layout
Scale 1"=50'
Boring No 483
Boring No 482
Contract No. 61.
Erie Canal
Section 9.
Between Adams Basin and west line of Monroe County.
DETAIL PLANS FOR CULVERT AT
STA. 3525+32 3522+00
OLD CULVERT NO. 55.
Scales as indicated.
Examined and approved
Special Deputy State Engineer.
MADE BY
TRACED BY
1st. CHECK BY
2nd. CHECK BY
18


LONGITUDINAL SECTION
Scale 1"=8'
PLAN
Scale 1"=8'
Note -
Excavation for trunk of culvert to be made where possible only to the neat lines of concrete and the concrete under such conditions to be deposited without backforms.
A-A
Scale 1"=4
B-B.
Scale 1"=8'
C-C.
Scale 1"=8'
D-D
Scale 1"=8
E-E
Scale 1"=4
Screen to be fastened to angle by 3/8" chain and approved lock
Screen to be painted as per bridge specifications
F-F
G-G
DETAILS AT INLET
Scale 1"=2
DETAILS OF SCREEN
Scale 1"=4
Concrete Symbols
2nd cl
3rd cl
BORINGS
No. 513
No 514
LAYOUT
Scale 1"=30'
Contract No. 61.
Erie Canal
Section 9.
Between Adams Basin and west line of Monroe County.
DETAIL PLANS OF CULVERT AT
STA. ~~3570+98~~ 3567+78
OLD CULVERT NO. 65 1/2.
Scales as indicated.
Examined and approved
Special Deputy State Engineer
19



NOTES—

The elevations of the bottoms of structures shown on this drawing are approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.
Excavation where possible to be made to neat lines of concrete only, and concrete under such conditions to be deposited without backforms.
Joints under slabs over the old culvert walls to be painted with asphalt paint before depositing slab.
Before depositing concrete upon old masonry or upon rock or joining concrete masonry with stone masonry, the surface of old masonry or of the rock is to be cleaned thoroughly and roughened, if directed by the Engineer, to secure a good bond.
No masonry is to rest on the edges of the Reinforced Concrete slabs.
In removing old masonry, the old embankment is to be disturbed as little as possible.
Edges of paving to be protected by a course of stone 18" in depth. Payment to be made therefor as second class paving.

SEE CHANGES PAGE 243

Contract No. 61.

Erie Canal — Section 9.

Between Adams Basin and west line of Monroe County.

DETAIL PLANS OF CULVERT AT

STA. ~~3595+72~~ 3592+33

OLD CULVERT NO. 56.

Scales as indicated.

Examined and approved

Special Deputy State Engineer.

July 6 1908

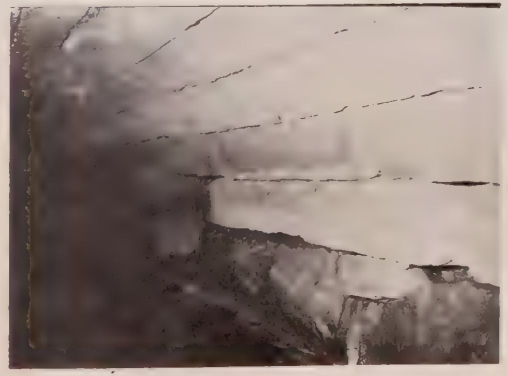
20

Culvert #57 151.5' of 4' Wide X 4.5' High Stone Block Arch and
80' of Concrete Arch

Entrance
Concrete in good condition except that right wingwall and corner of headwall has sheared and moved approximately 4" inward. Also, left wingwall has sheared from headwall. Deep scrape mark on right wingwall.

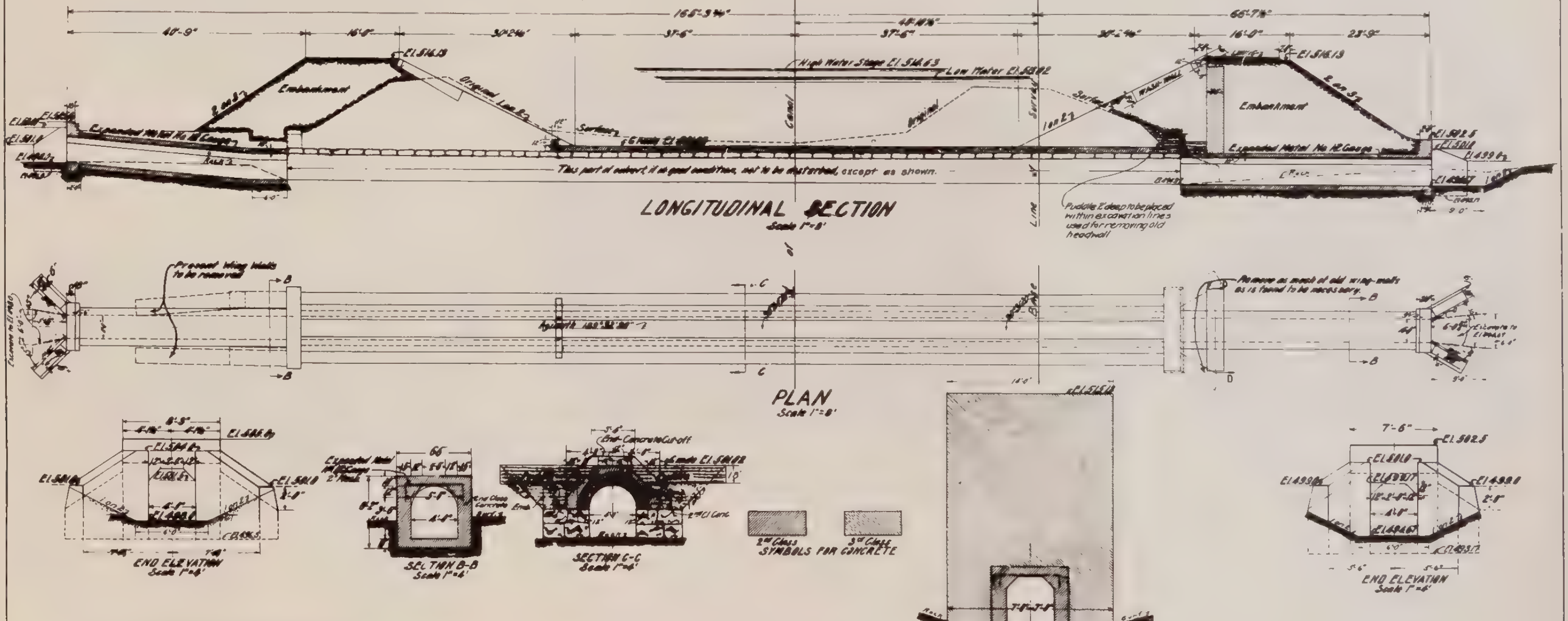
Exit
Headwall and wingwalls in fair to good condition with only a few small cracks.

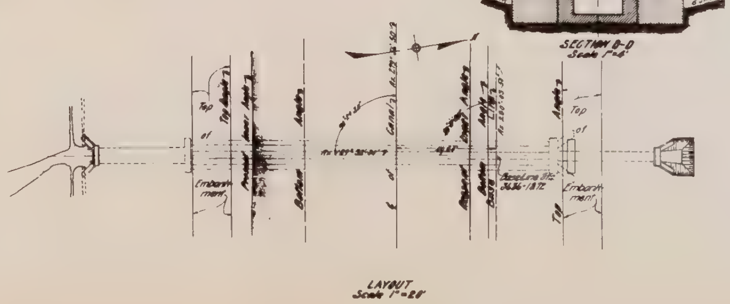
East Wall - partially missing block in ceiling, stick and board wedged in 1' deep hole.



East Wall - Looking North, note open joints

From north to south (exit to entrance) - between 10 and 20' into the concrete arch, there was a longitudinal overhead crack with some seepage. Stone block arch begins after 50'. About 100' in, a 1' x 2' stone block near base of stone block arch wall was missing (heavy water flow could be heard in rocks behind missing block). About 3' south of 2 plugged drains, a steady flow of water was coming through joints on east wall at the spring line. No mortar between the stone blocks. 75' from south end, 1 stone block on east and west wall are partially missing, but there was no leakage. Last 40' of concrete arch at south end was in good condition. 25' in from south end was a 12" diameter syphon in the ceiling. Repairs are needed.





—NOTES—

The elevations of the bottoms of structures shown on this drawing are approximate only and may be ordered by the Engineer to be placed at any elevations necessary for proper foundations.

Culvert extensions, at each end, to connect properly with present culvert in grade, in alignment and in joint.

Excavation in rock to be made only to neat lines of concrete and concrete under such conditions to be deposited without backforms.

Excavation for trunk of culvert to be made where possible only to the neat lines of concrete and the concrete under such conditions to be deposited without backforms

LAYOUT
Scale 1"=20'

SEE CHANGES
PAGE 243

Contract No. 61.

Erie Canal Section 9.

Between Adams Basin and west line of Monroe County.

DETAIL PLANS OF CULVERT AT

STA. ~~3636+19~~ 3632+87

OLD CULVERT NO 57

Scales as indicated

MADE BY ...
TRACED BY ...
1ST CHECK BY ...
2ND CHECK BY ...

Examined and approved

Special Deputy State Engineer.

July 6 1905

21

Culvert #58 (Dive)

144.5' of 48" Cast Iron Pipe
78.5' of 3.5' Wide x 4.5' High Concrete Arch

Not Inspected

Exit

Headwall and wingwalls in good condition. Culvert well filled with debris.

Culvert #58½ 145' of 16" Cast Iron Pipe

Entrance

The grate is apparently the entrance to this culvert which drains low areas behind the south canal wall.

A manhole buried under the towpath on the north side leads to the exit end.

Culvert #59

180' of Twin 42" Cast Iron Pipe
22' of 8' Wide x 4' High Concrete Box
100' Long Entrance on North End.
Entends ¼ Mile on South End to Brockport State College.

Culvert #59½

165' of ½-48" Concrete Pipe
(18" concrete encased sewer in bottom half of pipe)
35' of 36" Cast Iron Pipe
(Connects to north end of Culvert 59)

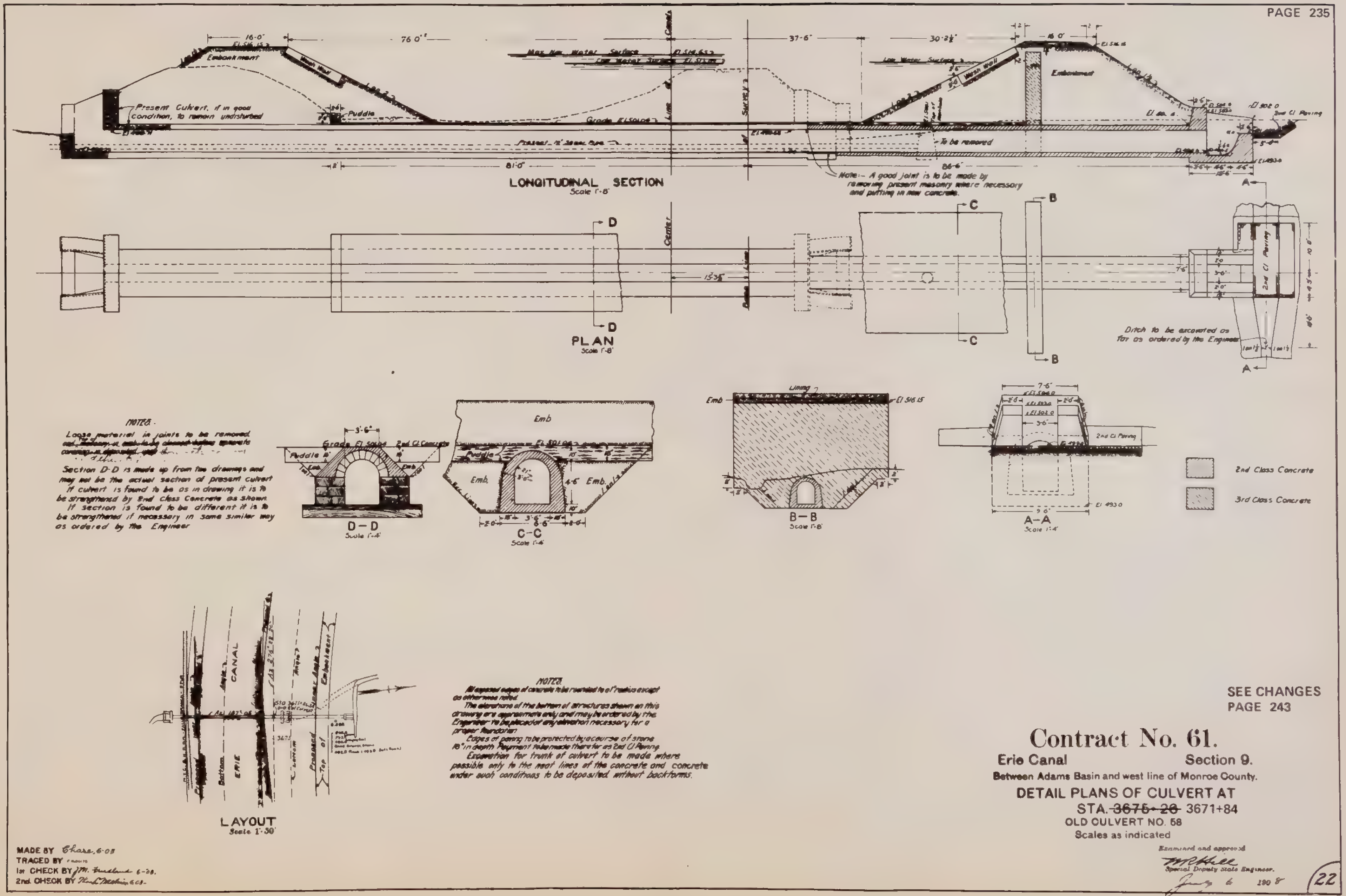
New Common Exit for Culverts #59 and 59½

Culvert #59

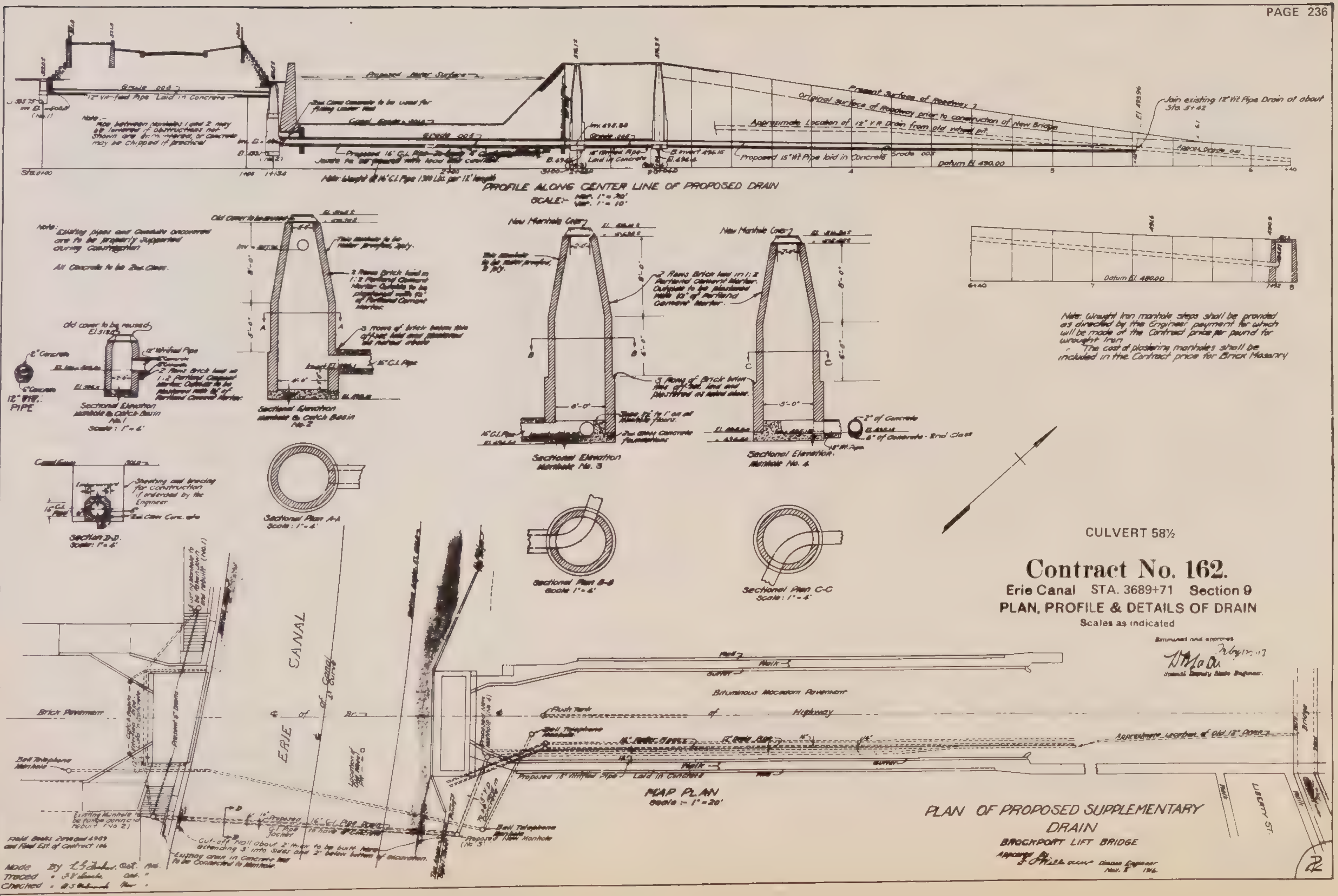
Good condition, some joint seepage.

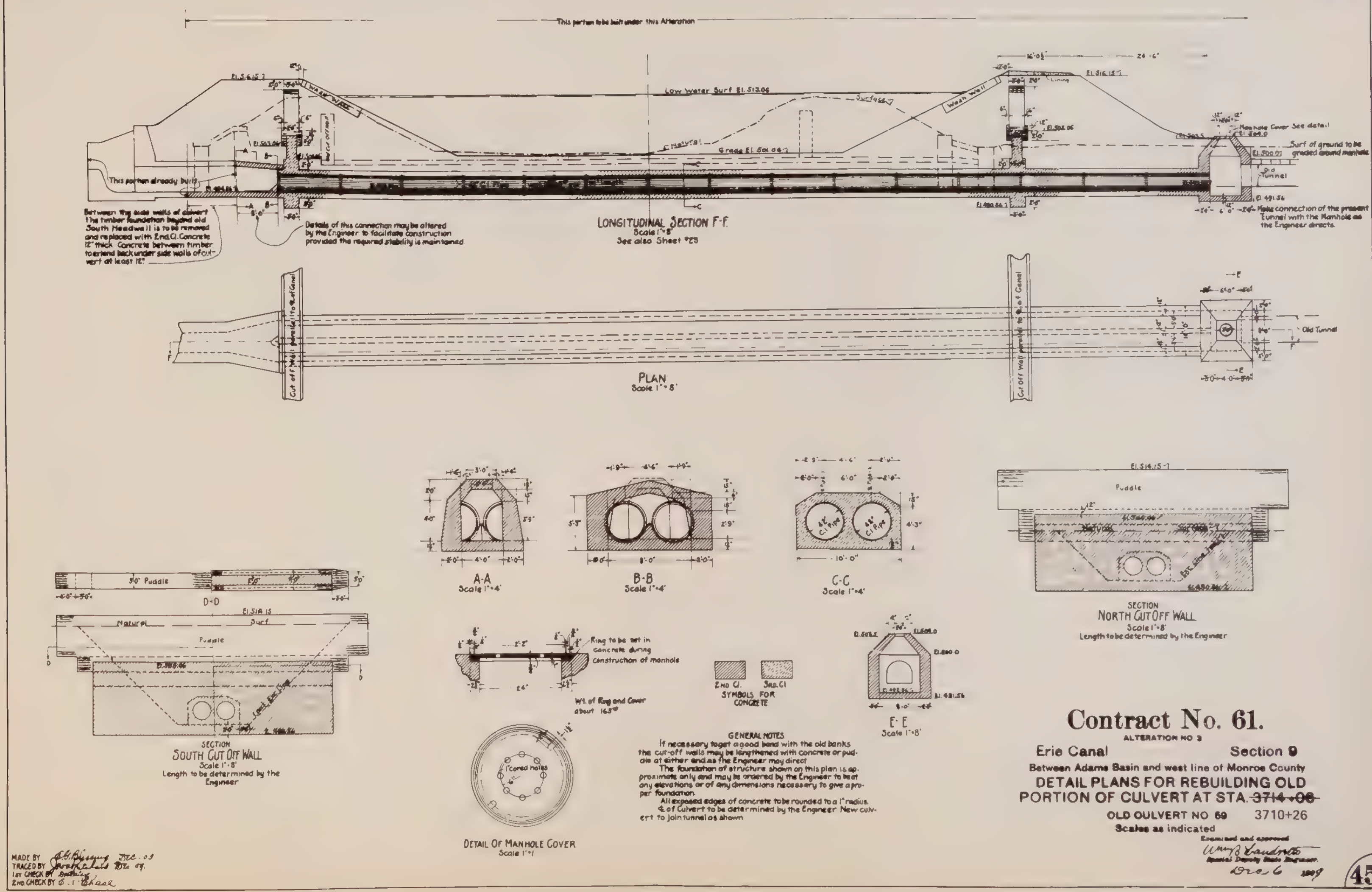
Culvert #59½

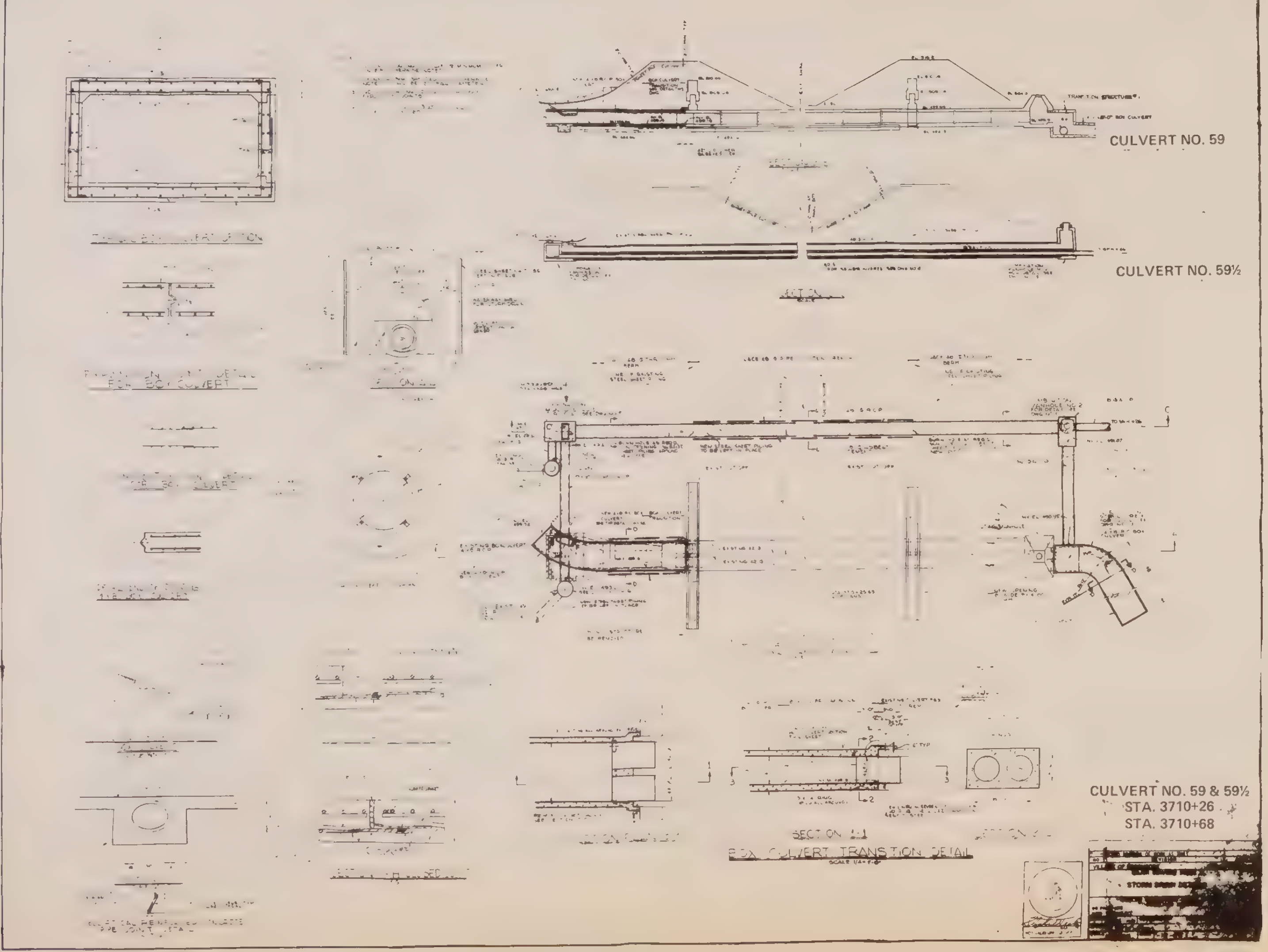
Most joints had seepage and some were covered with soda straws. Half the concrete pipe sections had cracked 1' south of the joints as denoted by efflorescence and soda straws. Some cracks went all the way around the semi-circular arch and the others 1/3 to 1/2 the way around. 36" connection in good condition. Installed by Village of Brockport Permit #66-1-9



PAGE 235
LONGITUDINAL SECTION
Scale 1"-8'
Present Culvert, if in good condition, to remain undisturbed
Embankment
Puddle
Wash Wall
Low Water Surface
To be removed
Note:– A good joint is to be made by removing present masonry where necessary and putting in new concrete.
PLAN
Scale 1"-8'
Ditch to be excavated as far as ordered by the Engineer
2nd Cl Paving
NOTES.
Section D-D is made up from two drawings and may not be the actual section of present culvert
If culvert is found to be as in drawing it is to be strengthened by 2nd Class Concrete as shown.
If section is found to be different it is to be strengthened if necessary in some similar way as ordered by the Engineer
D–D
Scale 1"-4'
C–C
Scale 1"-4'
B–B
Scale 1"-8'
A–A
Scale 1"-4'
Emb
2nd Class Concrete
3rd Class Concrete
LAYOUT
Scale 1"-30'
ERIE
CANAL
NOTES.
Edges of paving to be protected by a course of stone 18" in depth. Payment to be made therefor as 2nd Cl Paving
Excavation for trunk of culvert to be made where possible only to the neat lines of the concrete and concrete under such conditions to be deposited without backforms.
SEE CHANGES
PAGE 243
Contract No. 61.
Erie Canal
Section 9.
Between Adams Basin and west line of Monroe County.
DETAIL PLANS OF CULVERT AT
STA. ~~3675+20~~ 3671+84
OLD CULVERT NO. 58
Scales as indicated
MADE BY
TRACED BY
1st CHECK BY
2nd. CHECK BY
Examined and approved
Special Deputy State Engineer.
22


PROFILE ALONG CENTER LINE OF PROPOSED DRAIN
Proposed Water Surface
Present Surface of Roadway
Original Surface of Roadway prior to construction of New Bridge
Approximate Location of 12" V.P. Drain from old wheel pit.
Join existing 12" Vit. Pipe Drain at about Sta. 5+42
Proposed 15" Vit. Pipe laid in Concrete
Datum El. 490.00
12" Vitrified Pipe Laid in Concrete
Sectional Elevation Manhole & Catch Basin No. 1
Scale: 1" = 4'
Sectional Elevation Manhole & Catch Basin No. 2
Sectional Elevation Manhole No. 3
Sectional Elevation Manhole No. 4
New Manhole Cover
Old cover to be reused
All Concrete to be 2nd Class.
Section D-D.
Sectional Plan A-A
Scale: 1" = 4'
Sectional Plan B-B
Scale 1" = 4'
Sectional Plan C-C
Scale: 1" = 4'
12" Vit. Pipe
Datum El. 490.00
Note: Wrought Iron manhole steps shall be provided as directed by the Engineer, payment for which will be made at the Contract price per pound for wrought Iron.
The cost of plastering manholes shall be included in the Contract price for Brick Masonry
CULVERT 58½
Contract No. 162.
Erie Canal STA. 3689+71 Section 9
PLAN, PROFILE & DETAILS OF DRAIN
Scales as indicated
ERIE CANAL
Brick Pavement
Bituminous Macadam Pavement
Highway
Walk
Gutter
Bell Telephone Manhole
Proposed 15" Vitrified Pipe Laid in Concrete
Proposed New Manhole
KEY PLAN
Scale :- 1" = 20'
PLAN OF PROPOSED SUPPLEMENTARY DRAIN
BROCKPORT LIFT BRIDGE
LIBERTY ST.
Made By
Traced
Checked

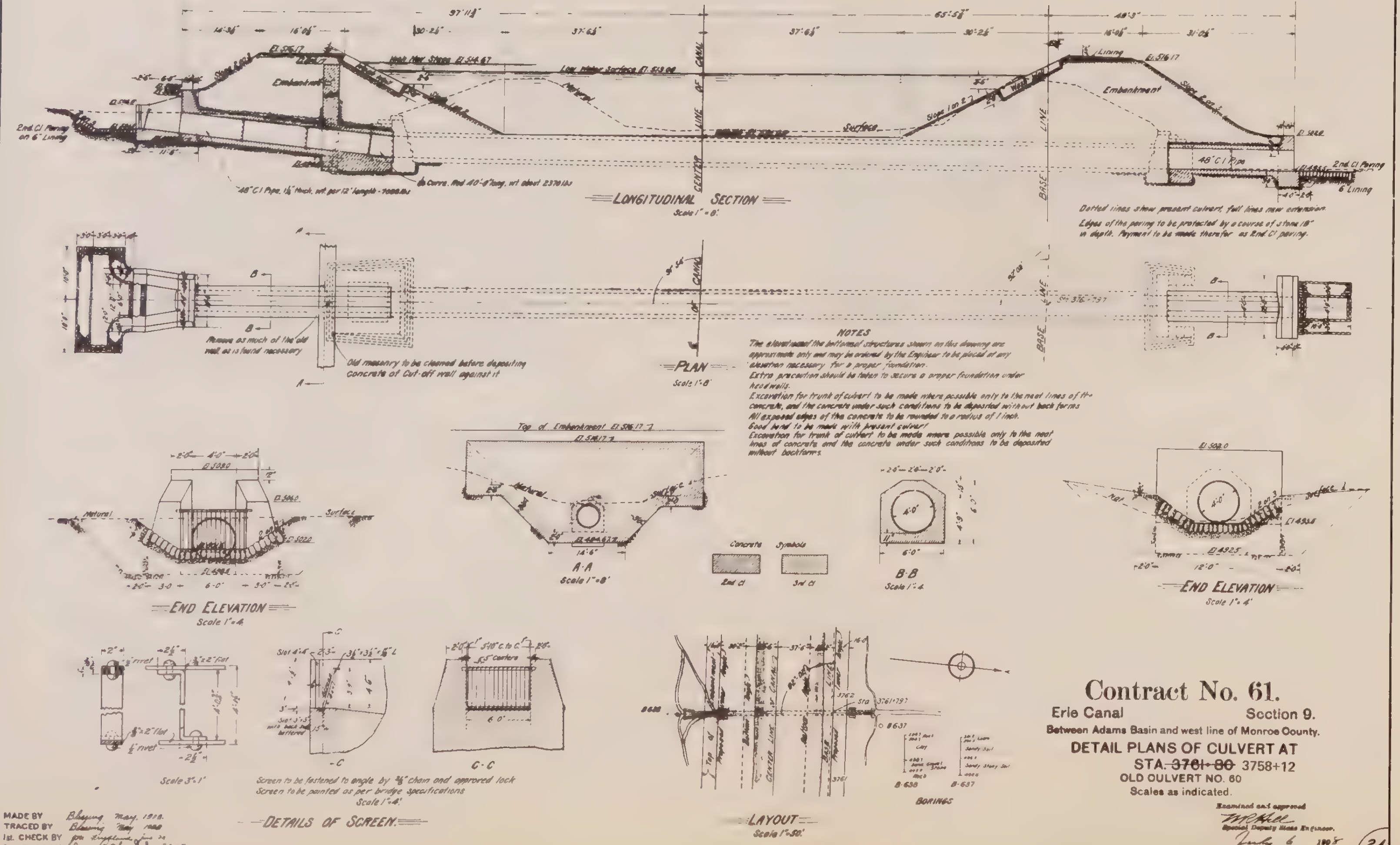

This portion to be built under this Alteration
Low Water Surf El. 513.06
Wash Wall
Grade El. 501.06
Natural
Surface
This portion already built
Between the side walls of culvert The timber foundation beyond old South Headwall is to be removed and replaced with 2nd Cl. Concrete 12" thick. Concrete between timber to extend back under side walls of culvert at least 12"
Details of this connection may be altered by the Engineer to facilitate construction provided the required stability is maintained
LONGITUDINAL SECTION F-F
Scale 1" = 8'
See also Sheet #25
Manhole Cover See detail
Surf. of ground to be graded around manhole
Old Tunnel
Make connection of the present Tunnel with the Manhole as the Engineer directs.
Cut off Wall parallel to ℄ of Canal
PLAN
Scale 1" = 8'
Old Tunnel
A-A
Scale 1" = 4'
B-B
Scale 1" = 4'
C-C
Scale 1" = 4'
48" C.I. Pipe
Puddle
SECTION
NORTH CUT OFF WALL
Scale 1" = 8'
Length to be determined by the Engineer
D-D
Natural
Surf.
Puddle
SECTION
SOUTH CUT OFF WALL
Scale 1" = 8'
Length to be determined by the Engineer
Ring to be set in concrete during construction of manhole
Wt. of Ring and Cover about 165#
1" cored holes
DETAIL OF MANHOLE COVER
Scale 1" = 1'
2nd Cl.
3rd Cl.
SYMBOLS FOR CONCRETE
E-E
Scale 1" = 8'
GENERAL NOTES
If necessary to get a good bond with the old banks the cut-off walls may be lengthened with concrete or puddle at either end as the Engineer may direct
The foundation of structure shown on this plan is approximate only and may be ordered by the Engineer to be at any elevations or of any dimensions necessary to give a proper foundation.
All exposed edges of concrete to be rounded to a 1" radius.
℄ of Culvert to be determined by the Engineer. New culvert to join tunnel as shown
Contract No. 61.
ALTERATION NO 3
Erie Canal
Section 9
Between Adams Basin and west line of Monroe County
DETAIL PLANS FOR REBUILDING OLD PORTION OF CULVERT AT STA. ~~3714+06~~
OLD CULVERT NO 69
3710+26
Scales as indicated
Examined and approved
Special Deputy State Engineer.
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY


CULVERT NO. 59
CULVERT NO. 59½
CULVERT NO. 59 & 59½
STA. 3710+26
STA. 3710+68
SECTION 1-1
BOX CULVERT TRANSITION DETAIL

Entrance
Headwall was in fair condition. Cracked, but intact. Wingwalls were in good condition. Trash rack had fallen over.

Exit
Headwall had one vertical crack in the center. Numerous transverse cracks with efflorescence. Structure in fair condition.

From north to south (exit to entrance) - The 2nd joint in the cast iron pipe has a 5" gap. (Pipe was not pushed into 5" long bell housing.) Concrete can be seen surrounding pipe. Joint has some seepage. 75' into pipe and 1' south of joint, a 6" square hole at the top of the pipe had a steel plate patch over it. This area leaked 6 steady drip streams of water. Some seepage through joints, but most were dry. Possible minor repairs needed at patch.



Contract No. 61.

Erie Canal — Section 9.

Between Adams Basin and west line of Monroe County.

DETAIL PLANS OF CULVERT AT STA. ~~3761+80~~ 3758+12

OLD CULVERT NO. 60

Scales as indicated.

Examined and approved

Special Deputy State Engineer.

July 6 1908

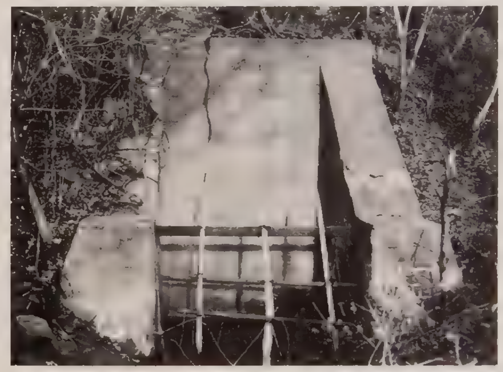
24

Culvert #61 (Dive) 204.5' of 5.5' Wide x 4'3" High Concrete Arch
Not Inspected

Entrance
Some cracks on headwall and wingwalls, but generally in fair to good condition. 6 syphons, 1 active.

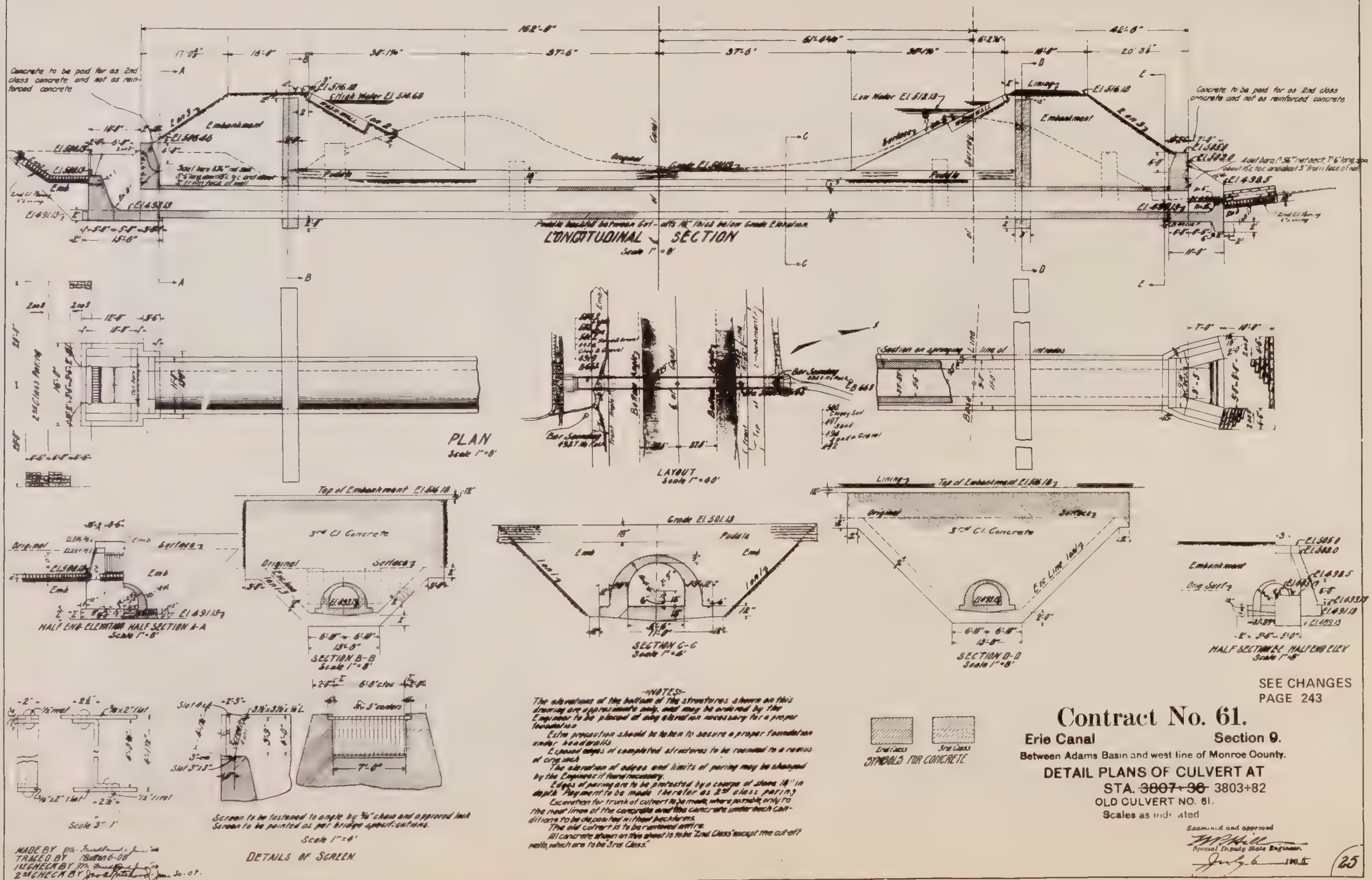
Exit
A few small cracks, but headwall and wingwalls generally in good condition.

Culvert #62 (Dive) 203' of 4' x 4' Concrete Arch
Not Inspected



Entrance
Headwall in good condition. Cracks and scaling on wingwalls, fair condition. Note attempts to fence off culvert well.

Exit
Headwall and wingwalls in fair condition, 1-2" deep scaling. 2 syphons, 10" syphon active.



—NOTES—

The elevations of the bottom of the structures shown on this drawing are approximate only, and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.

Extra precaution should be taken to secure a proper foundation under headwalls.

Exposed edges of completed structures to be rounded to a radius of one inch.

The elevation of edges and limits of paving may be changed by the Engineer if found necessary.

Edges of paving are to be protected by a course of stone 18" in depth. Payment to be made therefor as 2nd class paving.

Excavation for trunk of culvert to be made, where possible, only to the neat lines of the concrete and the concrete under such conditions to be deposited without backforms.

The old culvert is to be removed entire.

All concrete shown on this sheet is to be "2nd Class" except the cut-off walls, which are to be "3rd Class."

SEE CHANGES
PAGE 243

Contract No. 61.

Erie Canal **Section 9.**

Between Adams Basin and west line of Monroe County.

DETAIL PLANS OF CULVERT AT

STA. ~~3807+36~~ 3803+82

OLD CULVERT NO. 61.

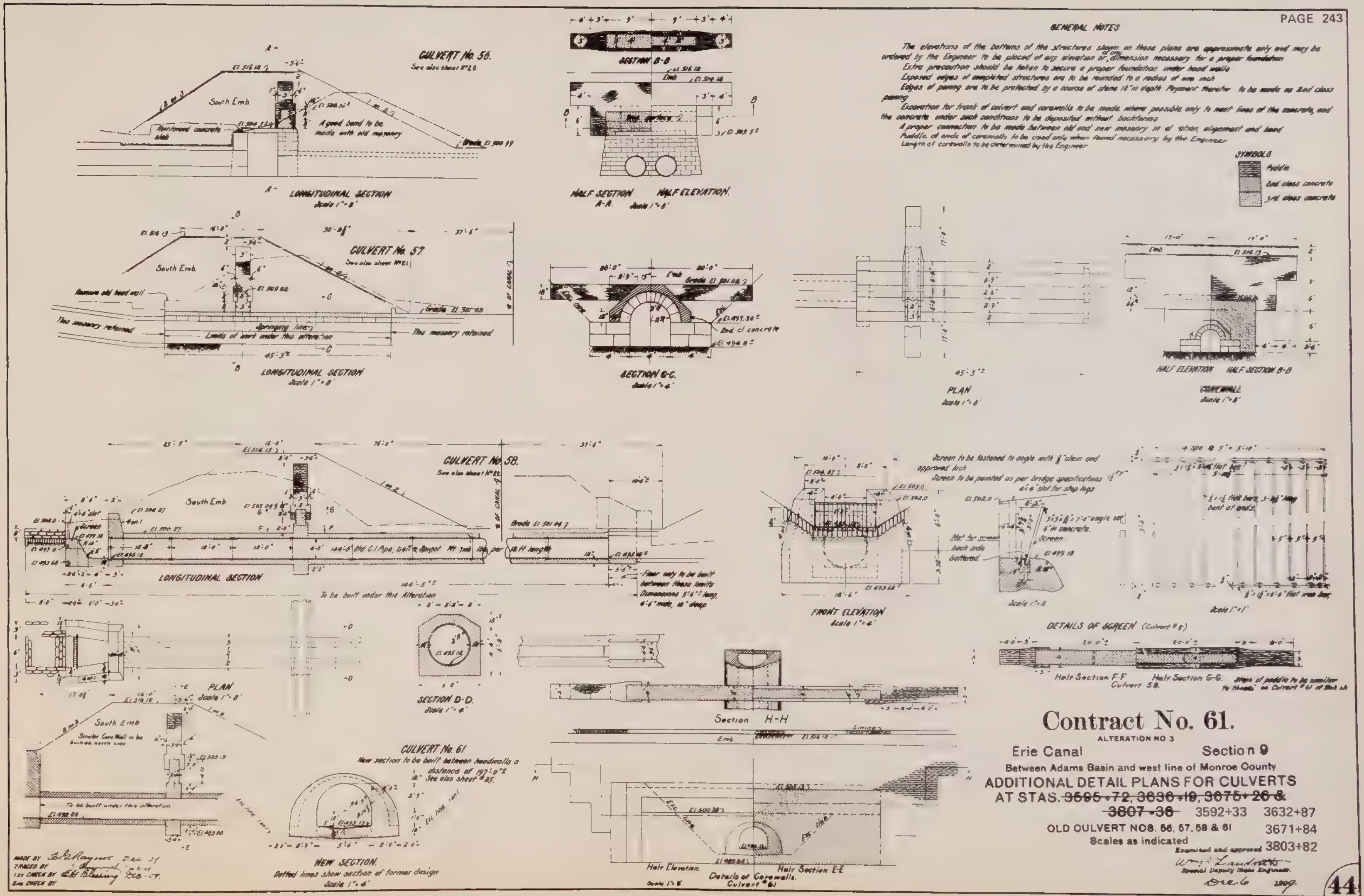
Scales as indicated

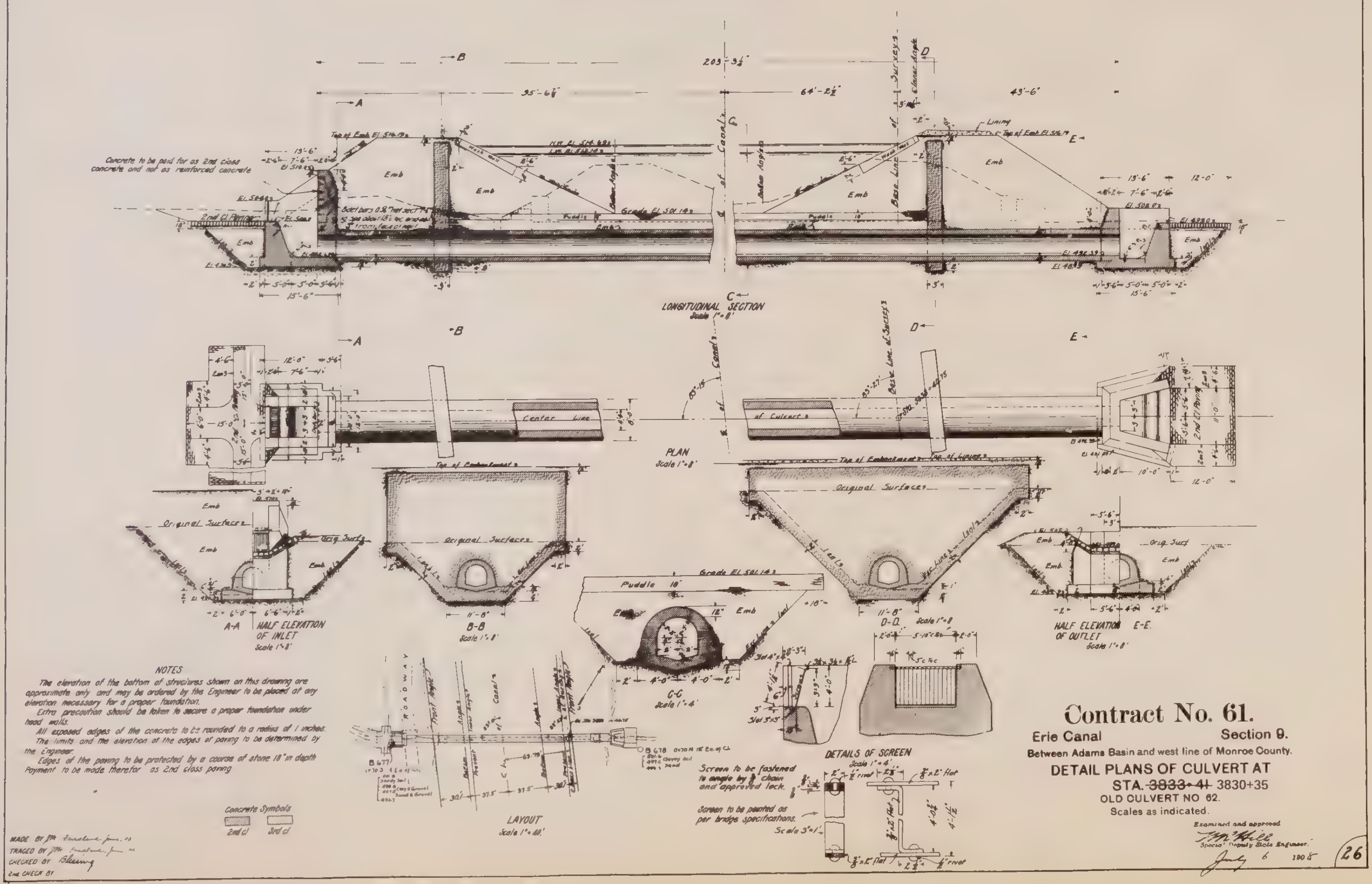
Examined and approved

Special Deputy State Engineer.

July 6 1905

25


GENERAL NOTES
The elevations of the bottoms of the structures shown on these plans are approximate only and may be ordered by the Engineer to be placed at any elevation or of any dimension necessary for a proper foundation
Extra precaution should be taken to secure a proper foundation under head walls
Exposed edges of completed structures are to be rounded to a radius of one inch
Edges of paving are to be protected by a course of stone 18" in depth. Payment therefor to be made as 2nd class paving
Excavation for trunk of culvert and corewalls to be made where possible only to neat lines of the concrete, and the concrete under such conditions to be deposited without backforms
A proper connection to be made between old and new masonry in elevation, alignment and bond
Puddle at ends of corewalls to be used only when found necessary by the Engineer
Length of corewalls to be determined by the Engineer
SYMBOLS
Puddle
2nd class concrete
3rd class concrete
CULVERT No. 56.
See also sheet No. 28
South Emb.
Reinforced concrete slab
A good bond to be made with old masonry
LONGITUDINAL SECTION
Scale 1" = 8'
SECTION B-B
HALF SECTION A-A.
HALF ELEVATION.
Scale 1" = 6'
CULVERT No. 57.
South Emb.
Remove old head wall
This masonry retained
Springing line
Limits of work under this alteration
LONGITUDINAL SECTION
Scale 1" = 8'
SECTION C-C.
Scale 1" = 4'
End of concrete
PLAN
Scale 1" = 8'
HALF ELEVATION
HALF SECTION B-B
Scale 1" = 8'
CULVERT No. 58.
South Emb
LONGITUDINAL SECTION
To be built under this Alteration
Floor only to be built between these limits. Dimensions 5'-6" long, 4'-6" wide, 18" deep
Screen to be fastened to angle with 3/8" chain and approved lock
Screen to be painted as per bridge specifications
FRONT ELEVATION
Scale 1" = 4'
Screen
Scale 1" = 2
Scale 1" = 1'
DETAILS OF SCREEN (Culvert No. 58)
PLAN
Scale 1" = 8'
SECTION D-D.
Scale 1" = 4'
Section H-H
Half Section F-F
Half Section G-G.
Culvert 58.
South Emb
CULVERT No. 61
New section to be built between headwalls a distance of 197'-0"
See also sheet No. 85.
To be built under this alteration
NEW SECTION.
Dotted lines show section of former design
Scale 1" = 4'
Half Elevation.
Half Section E-E
Details of Corewalls.
Culvert No. 61
Contract No. 61.
ALTERATION NO 3
Erie Canal
Section 9
Between Adams Basin and west line of Monroe County
ADDITIONAL DETAIL PLANS FOR CULVERTS
AT STAS. 3595+72, 3636+19, 3675+26 & 3807+36
3592+33
3632+87
3671+84
3803+82
OLD CULVERT NOS. 56, 57, 58 & 61
Scales as indicated
Examined and approved
Special Deputy State Engineer.
1909.
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
44


LONGITUDINAL SECTION
Scale 1" = 8'
Concrete to be paid for as 2nd class concrete and not as reinforced concrete
PLAN
Scale 1" = 8'
A-A HALF ELEVATION OF INLET
Scale 1" = 8'
B-B
Scale 1" = 8'
C-C
Scale 1" = 4'
D-D
Scale 1" = 8
HALF ELEVATION E-E.
OF OUTLET
Scale 1" = 8'
DETAILS OF SCREEN
Scale 1" = 4'
Screen to be fastened to angle by 3/8" chain and approved lock.
Screen to be painted as per bridge specifications.
LAYOUT
Scale 1" = 40'
NOTES
The elevation of the bottom of structures shown on this drawing are approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.
Extra precaution should be taken to secure a proper foundation under head walls.
All exposed edges of the concrete to be rounded to a radius of 1 inches.
The limits and the elevation of the edges of paving to be determined by the Engineer.
Edges of the paving to be protected by a course of stone 18" in depth Payment to be made therefor as 2nd class paving
Concrete Symbols
2nd cl
3rd cl
MADE BY
TRACED BY
CHECKED BY
2nd CHECK BY
Contract No. 61.
Erie Canal
Section 9.
Between Adams Basin and west line of Monroe County.
DETAIL PLANS OF CULVERT AT
STA. ~~3833+41~~ 3830+35
OLD CULVERT NO 62.
Scales as indicated.
Examined and approved
Special Deputy State Engineer.
July 6 1908
26

Culvert #63 (½ Dive) 197.5' of 60" Cast Iron Pipe
Not Inspected

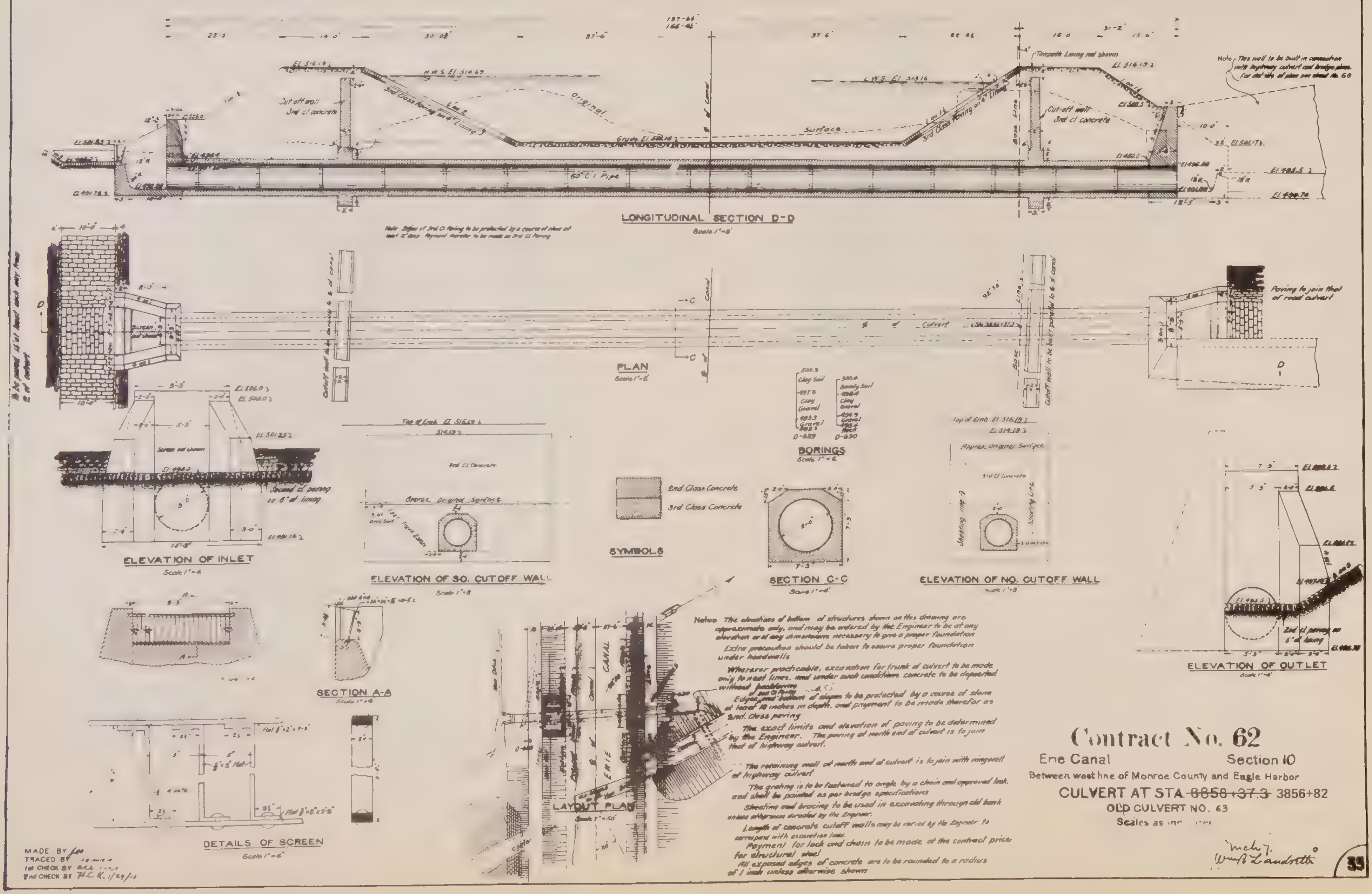
Exit

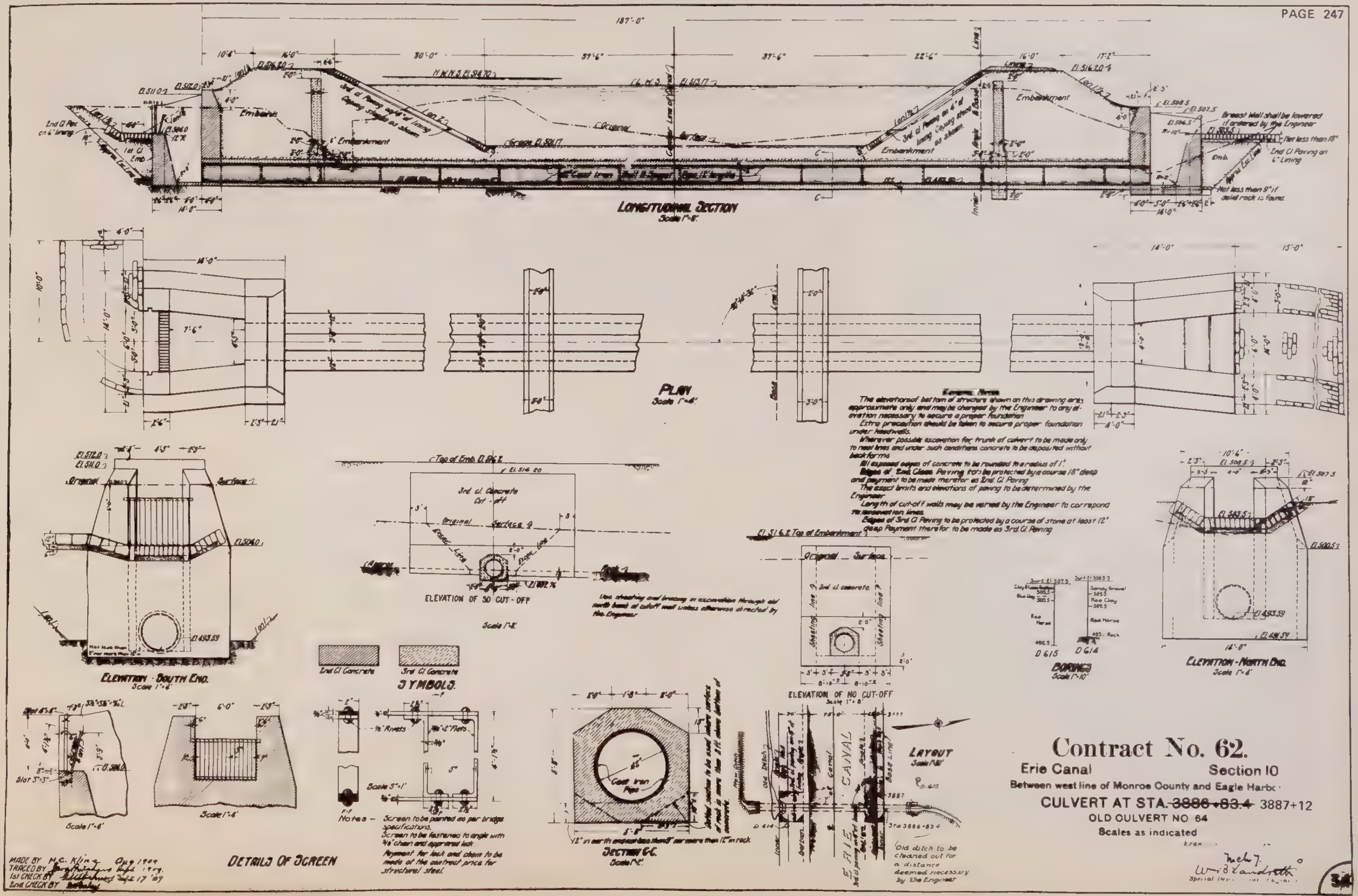
Top 6' of headwall in good condition.
Bottom 10' of headwall in fair to poor condition.
1 syphon. Roots growing out 8" deep scaled area 10' from top of headwall. Right wingwall was delaminated and in fair condition. Left wingwall is actually a large retaining wall (40' long, 20' high) for an abandoned road over the canal. Old road had twin 4' x 4' stone block arch culverts. North culvert has collapsed. South culvert has a 42" corrugated metal pipe inside. Gap between stone blocks and metal pipe grouted.

Culvert #64 (Dive) 187' of 42" Cast Iron Pipe
Not Inspected

Exit

Headwall and wingwalls in poor condition. 4" deep scaling on headwall and much deeper on wingwalls.

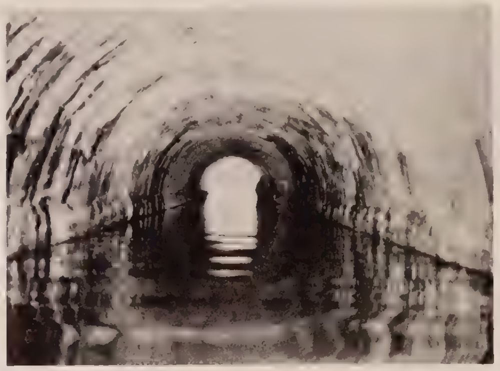

LONGITUDINAL SECTION D-D
Scale 1" = 8'
60" C.I. Pipe
Cut off wall
3rd cl concrete
3rd Class Paving on 6" Lining
Original
Surface
H.W.S. El. 514.69
L.W.S. El. 513.16
Towpath Lining not shown
Cut-off wall
3rd cl concrete
Base Line
PLAN
Scale 1" = 8'
ELEVATION OF INLET
Scale 1" = 4'
Second cl paving on 6" of lining
ELEVATION OF SO. CUTOFF WALL
Scale 1" = 8'
Approx. Original Surface
3rd Cl Concrete
SYMBOLS
2nd Class Concrete
3rd Class Concrete
BORINGS
Scale 1" = 6'
SECTION C-C
Scale 1" = 4'
ELEVATION OF NO. CUTOFF WALL
Scale 1" = 8'
Sheeting Line
ELEVATION OF OUTLET
Scale 1" = 4'
2nd cl paving on 6" of lining
Paving to join that of road culvert
SECTION A-A
Scale 1" = 4'
DETAILS OF SCREEN
Scale 1" = 4'
LAYOUT PLAN
Scale 1" = 50'
CANAL
ERIE
Notes The elevations of bottom of structures shown on this drawing are approximate only, and may be ordered by the Engineer to be at any elevation and of any dimensions necessary to give a proper foundation
Extra precaution should be taken to secure proper foundation under headwalls
Wherever practicable, excavation for trunk of culvert to be made only to neat lines, and under such conditions concrete to be deposited without backforms
Edges and bottom of slopes to be protected by a course of stone at least 18 inches in depth, and payment to be made therefor as 2nd. Class paving
The exact limits and elevation of paving to be determined by the Engineer. The paving at north end of culvert is to join that of highway culvert.
The retaining wall at north end of culvert is to join with wingwall of highway culvert
The grating is to be fastened to angle by a chain and approved lock, and shall be painted as per bridge specifications
Sheeting and bracing to be used in excavating through old bank unless otherwise directed by the Engineer.
Length of concrete cutoff walls may be varied by the Engineer to correspond with excavation lines.
Payment for lock and chain to be made at the contract price for structural steel
All exposed edges of concrete are to be rounded to a radius of 1 inch unless otherwise shown
Contract No. 62
Erie Canal
Section 10
Between west line of Monroe County and Eagle Harbor
CULVERT AT STA. 3858+37.3 3856+82
OLD CULVERT NO. 63
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY


LONGITUDINAL SECTION
Scale 1"=8'
PLAN
Scale 1"=8'
The elevations of bottom of structure shown on this drawing are approximate only and may be changed by the Engineer to any elevation necessary to secure a proper foundation.
Extra precaution should be taken to secure proper foundation under headwalls.
Wherever possible excavation for trunk of culvert to be made only to neat lines and under such conditions concrete to be deposited without back forms.
All exposed edges of concrete to be rounded to a radius of 1".
The exact limits and elevations of paving to be determined by the Engineer.
Length of cut-off walls may be varied by the Engineer to correspond to excavation lines.
Edges of 3rd Cl Paving to be protected by a course of stone at least 12" deep. Payment therefor to be made as 3rd Cl Paving.
ELEVATION - SOUTH END
Scale 1"=6'
ELEVATION OF 3O CUT-OFF
Scale 1"=8'
2nd Cl Concrete
3rd Cl Concrete
SYMBOLS
ELEVATION OF NO CUT-OFF
BORINGS
ELEVATION - NORTH END
Scale 1"=6'
DETAILS OF SCREEN
SECTION C-C
LAYOUT
Notes - Screen to be painted as per bridge specifications.
Screen to be fastened to angle with 3/8" chain and approved lock.
Payment for lock and chain to be made at the contract price for structural steel.
Old ditch to be cleaned out for a distance deemed necessary by the Engineer
Contract No. 62.
Erie Canal
Section 10
Between west line of Monroe County and Eagle Harbor
CULVERT AT STA. 3886+83.4 3887+12
OLD CULVERT NO. 64
Scales as indicated
MADE BY H.C. Kline Aug 1909

Culvert #65 364' of 12' Wide x 11'1" High Stone Block Arch and 156' of Concrete Arch

Entrance

Headwall and wingwall areas in fair to good condition with cracks, cold joints and scaling. Left wingwall was partially undermined. South end concrete arch constructed when embankment was widened for railway. See Holley Trough Introduction and Plans.



Looking South Toward Entrance

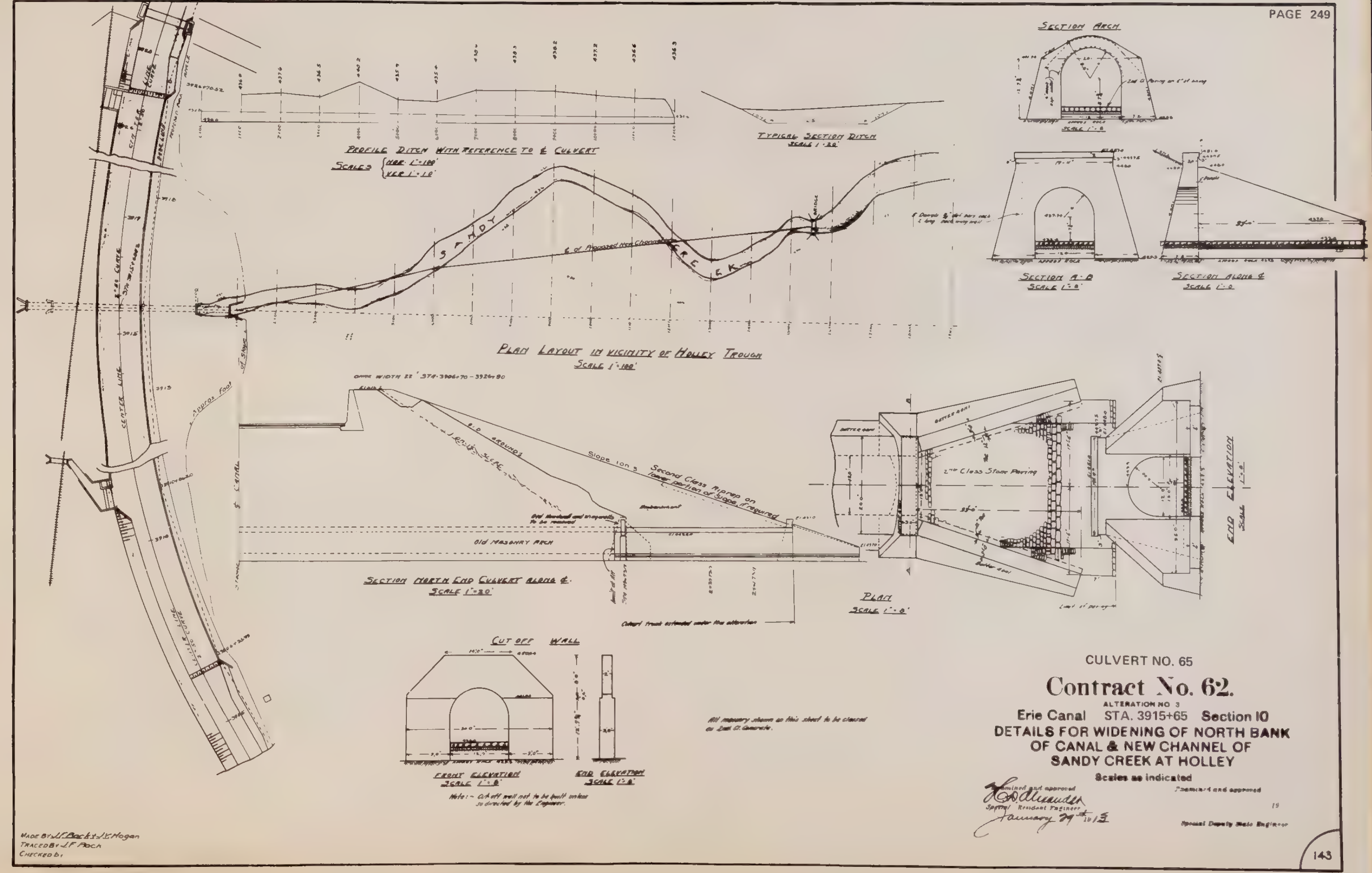
Heavy buildup (2" or more) of mineral deposits on the stone block arch walls from slow seepage. A concrete encased sewer pipe runs along the west side of the barrel. One can walk along the top for about 100' from the south end before the water gets too deep for hip boots.

Exit

Headwall and wingwalls in fair condition due to numerous cracks. Water in culvert about 4' deep.

Method of Inspecting Culverts #65 and 86

From south to north (entrance to exit) - south entrance for 50' was concrete arch. The arch was in good condition except for scaling along the bottom portion. The stone block arch had a large number of short soda straws and heavy efflorescence with constant dripping for the first 15'. The arch was dry for the next 40-50', after which dripping continued the length of the barrel to the north concrete arch (a few steady drips, but nearly all were slow, 1 drip every few seconds). Efflorescence from 1-3" thick, in streaks, covered both walls and indicated active seepage. North concrete arch had approximately 6 areas of spalled concrete 2" in depth. Expanded metal lath, used in the construction of the north arch, was approximately 5% exposed due to spalling of concrete. North concrete arch was dry, except for slow seepage at a few joints. Except for a few voids between some stone blocks, the blocks in the barrel were in good condition. None seemed to be missing, slipped or cracked, but it was difficult to see under the thick coating of mineral deposits. Although the culvert appeared to be fair to good condition, no inspection could be made below the water line.



CULVERT NO. 65

Contract No. 62.

ALTERATION NO. 3

Erie Canal STA. 3915+65 Section 10

DETAILS FOR WIDENING OF NORTH BANK OF CANAL & NEW CHANNEL OF SANDY CREEK AT HOLLEY

Scales as indicated

Examined and approved
H. D. Alexander
Special Resident Engineer
January 29th 1913

Examined and approved
19
Special Deputy State Engineer

Culvert #66 207' of 42" Cast Iron Pipe
Not Inspected

Exit

Top half of headwall and top of wingwalls in good condition. Bottom section of headwall area and wingwalls in fair to poor condition with deep scaling, cracks and delaminations. Water in culvert could be lowered 1-2' by cleaning out ditch.

Culvert #67 231' of 48" Cast Iron Pipe

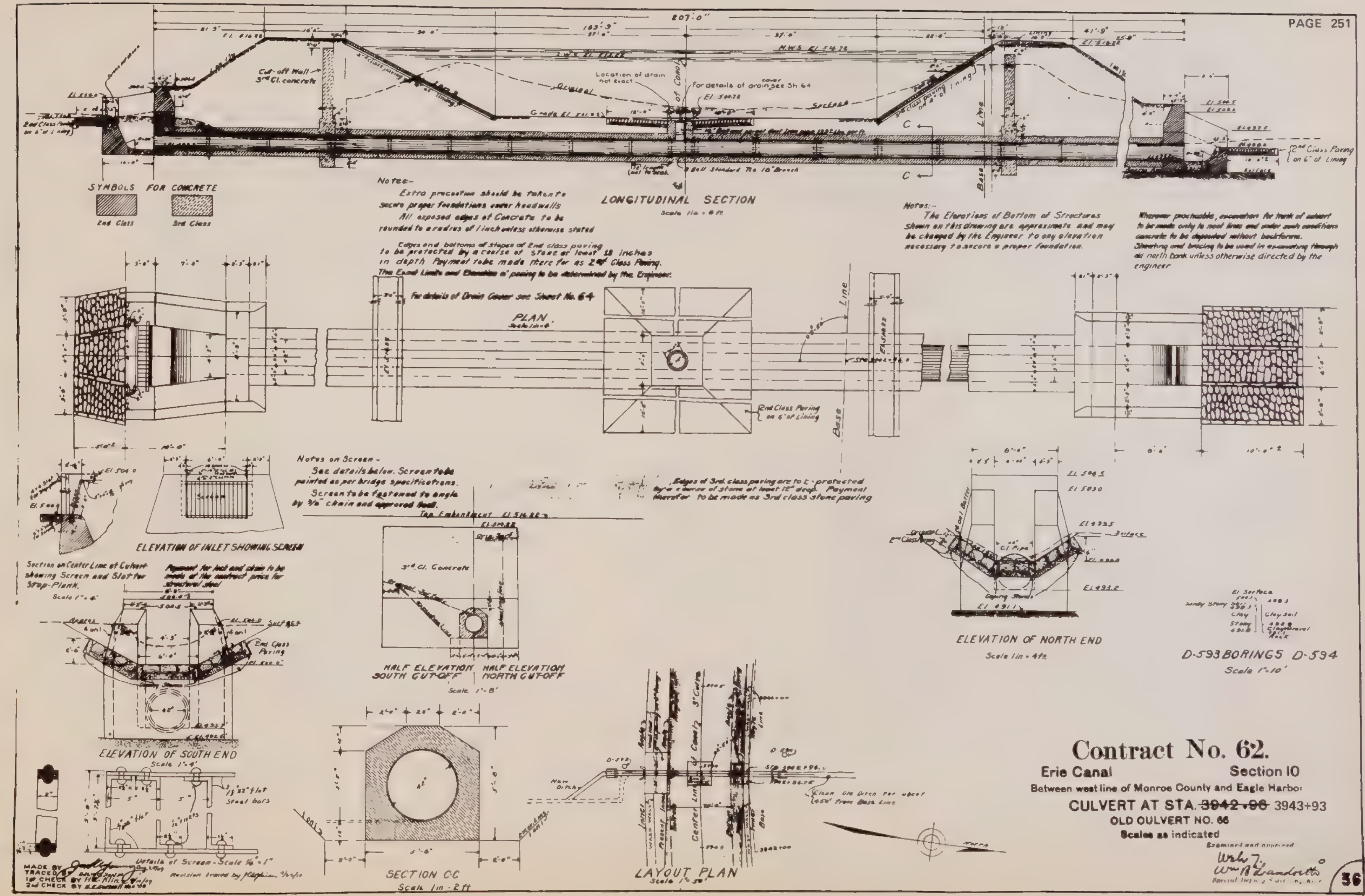
Entrance

Headwall had a vertical crack over the center of the pipe. Generally headwall was in good condition. Wingwalls were in fair to good condition with some transverse cracks and efflorescence in the middle.

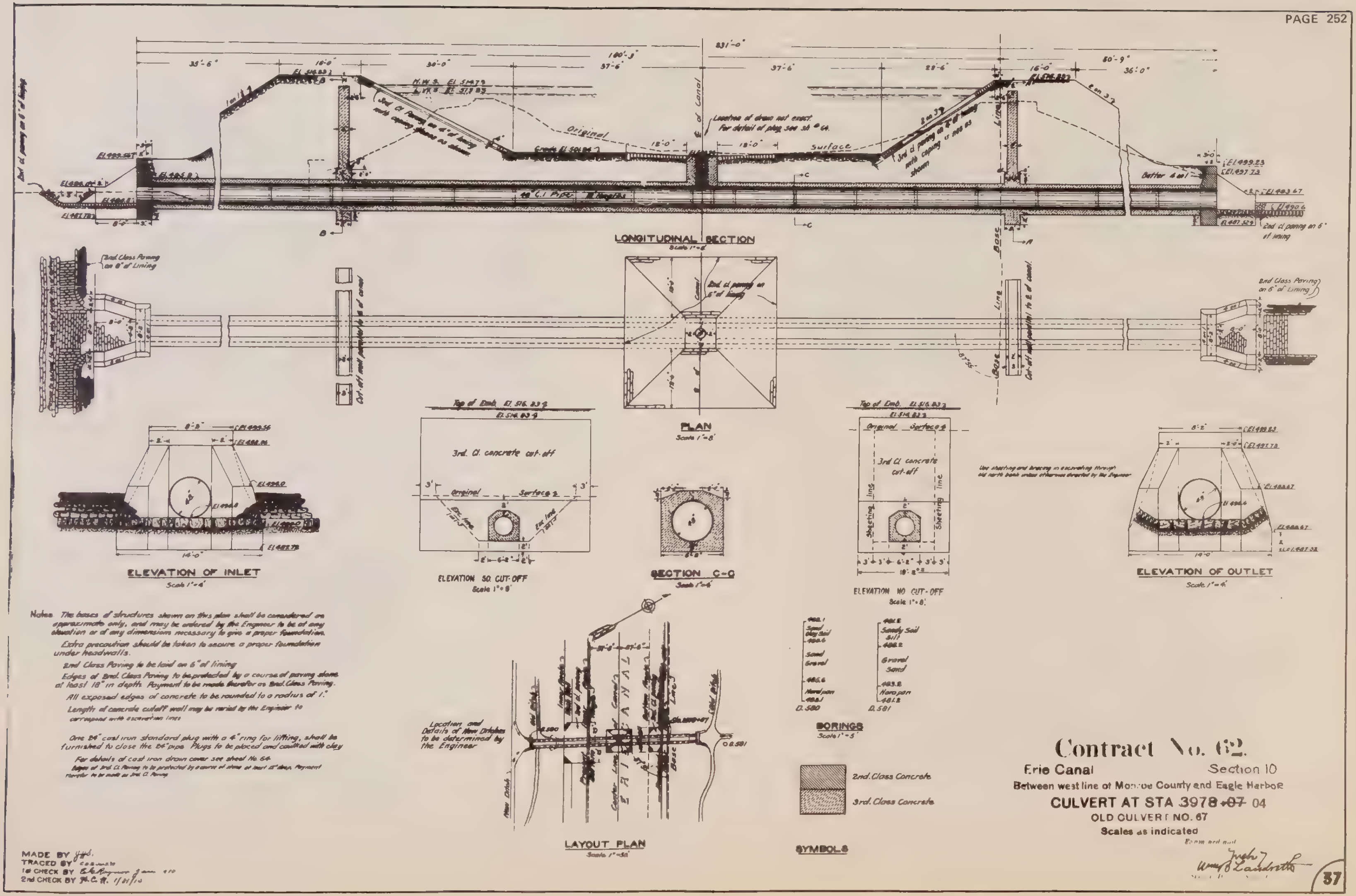
Exit

There was one vertical carck in the headwall. Otherwise, headwall and wingwalls were in good condition.

Cast iron pipe in good condition. Some drippage at 24" center drain. Slight zig zag in pipe noticed from the ends, but it cannot be detected inside.



207'-0"
LONGITUDINAL SECTION
Scale 1in. = 8 ft.
Cut-off Wall 3rd Cl. concrete
Location of drain not exact
For details of drain cover see Sh 64
SYMBOLS FOR CONCRETE
2nd Class
3rd Class
Notes-
Extra precaution should be taken to secure proper foundations under headwalls
All exposed edges of Concrete to be rounded to a radius of 1 inch unless otherwise stated
Edges and bottoms of slopes of 2nd class paving to be protected by a course of stone at least 18 inches in depth. Payment to be made therefor as 2nd Class Paving.
The Exact Limits and Elevation of paving to be determined by the Engineer.
Notes:-
The Elevations of Bottom of Structures shown on this drawing are approximate and may be changed by the Engineer to any elevation necessary to secure a proper foundation.
Wherever practicable, excavation for trunk of culvert to be made only to neat lines and under such conditions concrete to be deposited without backforms.
Sheeting and bracing to be used in excavating through old north bank unless otherwise directed by the engineer
For details of Drain Cover see Sheet No. 64
PLAN
2nd Class Paving on 6" of Lining
Notes on Screen -
See details below. Screen to be painted as per bridge specifications.
Screen to be fastened to angle by 3/8" chain and approved lock.
Edges of 3rd class paving are to be protected by a course of stone at least 12" deep. Payment therefor to be made as 3rd class stone paving
ELEVATION OF INLET SHOWING SCREEN
Section on Center Line of Culvert showing Screen and Slot for Stop-Plank.
Scale 1" = 4'
Payment for lock and chain to be made at the contract price for structural steel
3rd Cl. Concrete
HALF ELEVATION SOUTH CUT-OFF
HALF ELEVATION NORTH CUT-OFF
Scale 1" = 8'
ELEVATION OF NORTH END
Scale 1 in = 4 ft.
D-593 BORINGS D-594
Scale 1" = 10'
ELEVATION OF SOUTH END
Scale 1" = 4'
Details of Screen - Scale 1/4" = 1"
SECTION C-C
Scale 1 in. = 2 ft
LAYOUT PLAN
Scale 1" = 50'
Contract No. 62.
Erie Canal
Section 10
Between west line of Monroe County and Eagle Harbor
CULVERT AT STA. 3942+96 3943+93
OLD CULVERT NO. 66
Scales as indicated
Examined and approved
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
36


LONGITUDINAL SECTION
Scale 1"=8'
48" C.I. Pipe
Original
Surface
PLAN
Scale 1"=8'
ELEVATION OF INLET
Scale 1"=4'
ELEVATION SO. CUT-OFF
Scale 1"=8'
3rd. Cl. concrete cut-off
SECTION C-C
Scale 1"=4'
ELEVATION NO. CUT-OFF
Scale 1"=8'
ELEVATION OF OUTLET
Scale 1"=4'
LAYOUT PLAN
Scale 1"=50'
Location and Details of New Ditches to be determined by the Engineer
BORINGS
Scale 1"=5'
D.580
D.581
SYMBOLS
2nd. Class Concrete
3rd. Class Concrete
Notes. The bases of structures shown on this plan shall be considered as approximate only, and may be ordered by the Engineer to be at any elevation or of any dimension necessary to give a proper foundation.
Extra precaution should be taken to secure a proper foundation under headwalls.
2nd Class Paving to be laid on 6" of lining.
Edges of 2nd. Class Paving to be protected by a course of paving stone at least 18" in depth. Payment to be made therefor as 2nd. Class Paving.
All exposed edges of concrete to be rounded to a radius of 1".
One 24" cast iron standard plug with a 4" ring for lifting, shall be furnished to close the 24" pipe. Plugs to be placed and caulked with clay.
For details of cast iron drain cover see sheet No. 64.
Contract No. 62.
Erie Canal
Section 10
Between west line of Monroe County and Eagle Harbor
CULVERT AT STA 3978+07 04
OLD CULVERT NO. 67
Scales as indicated
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
37

Culvert #68 240' of 42" Cast Iron Pipe

Exposed sheetpiling on south embankment. Widewater area is at left. The south end of this culvert was plugged prior to creating the widewater area. See Introduction, Canal Culverts.

Exit
Headwall and wingwalls in good condition

No active leakage, but 2 joints in north half had 1' long stalagtites. No leakage at 18" drain at center. South half of pipe partially filled with silt, gravel.

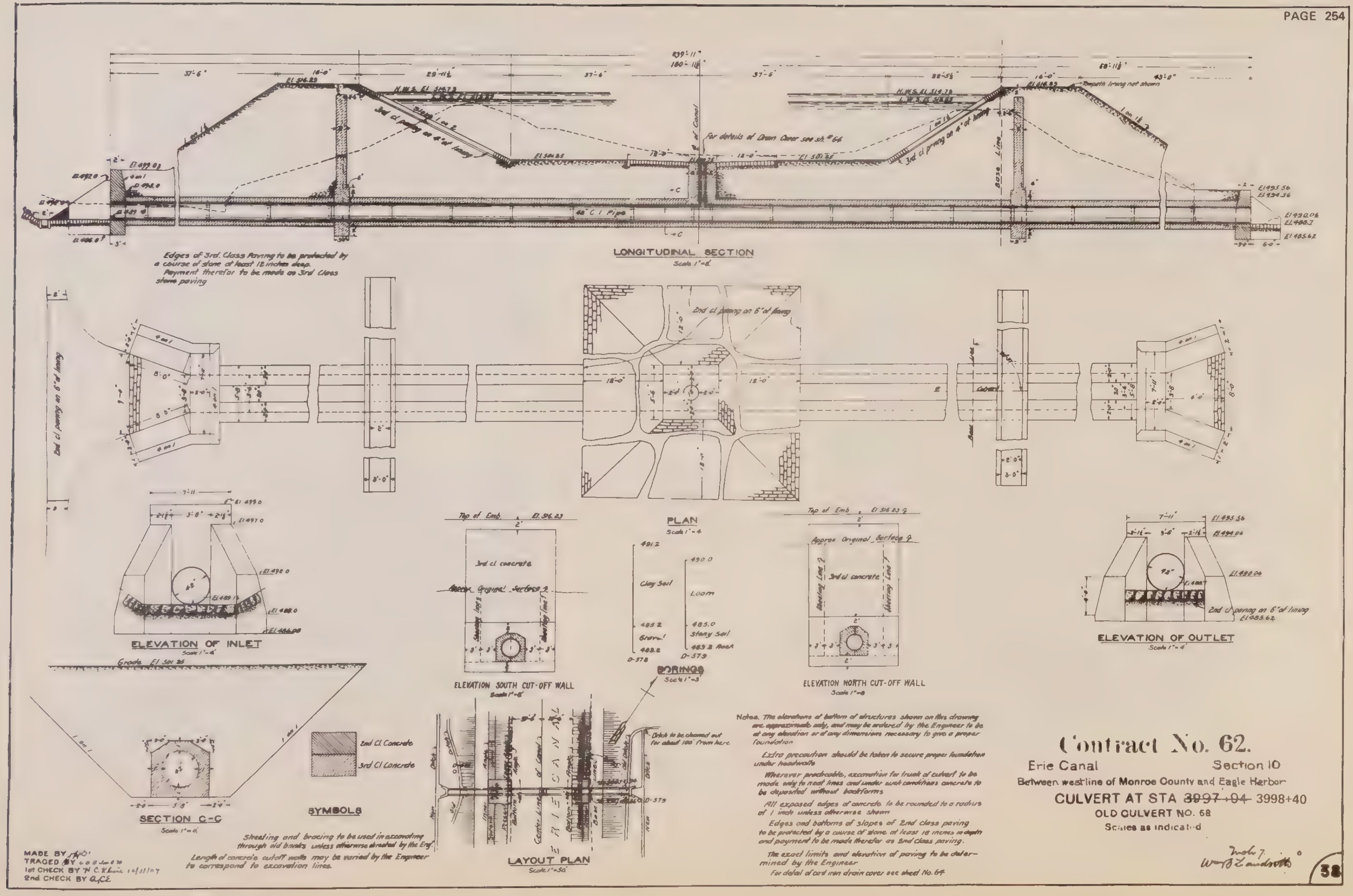
South end of pipe ended at round wooden plug. Entrance area filled with concrete prior to flooding widewaters. Cast iron pipe in good condition.

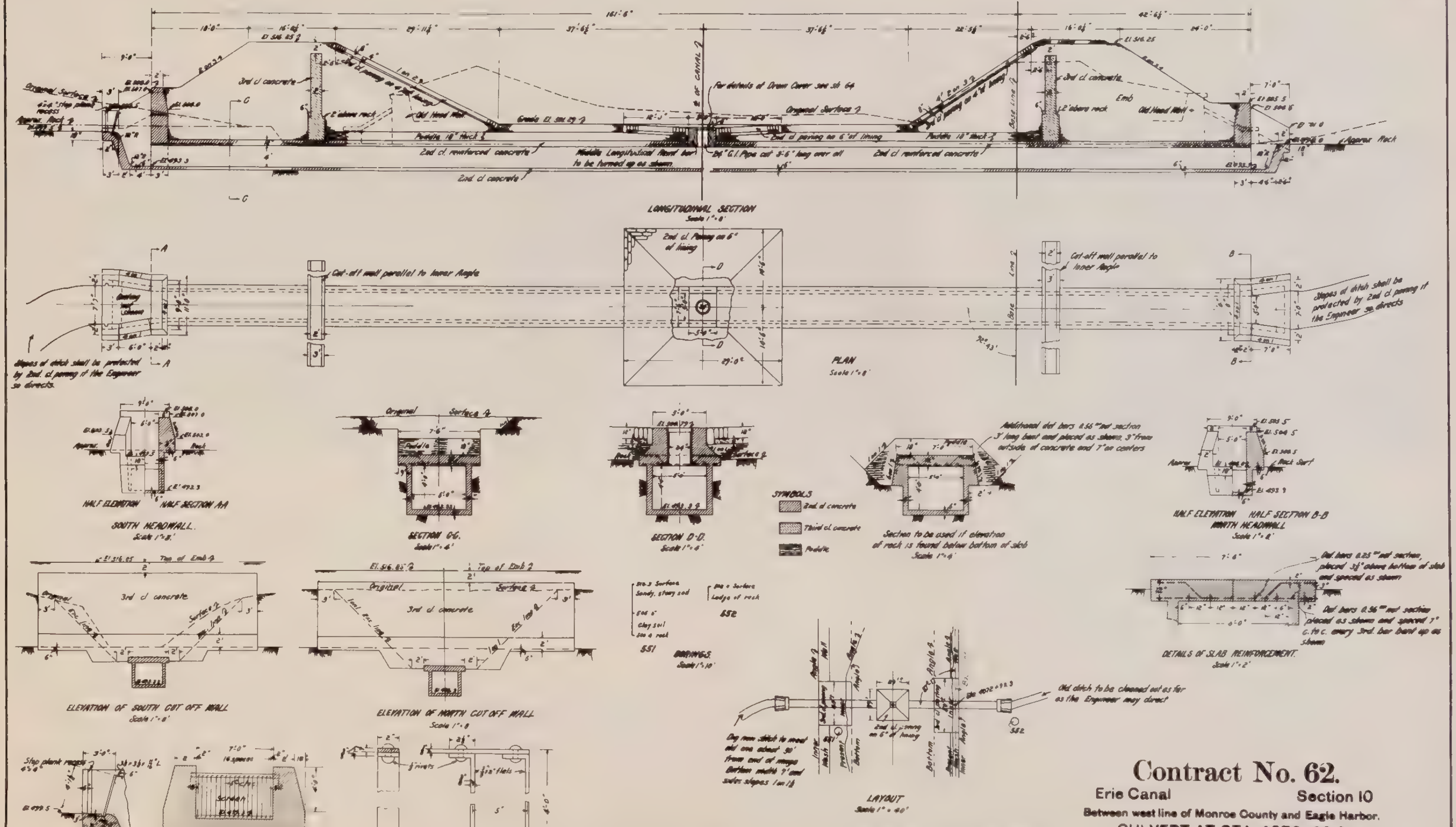
Culvert #69 (Dive) 204' of 5' Wide X 4' High Concrete Box
Not Inspected

Entrance
Headwall and wingwalls in fair condition due to many cracks. Scaling at end of wingwalls. Water level dropped 6" by cleaning out channel at exit end.

Exit
Headwall and wingwalls in fair condition due to many cracks. Right corner of headwall missing.

Water seemed to be coming out of rock and brush covered embankment next to left wingwall. Water level was dropped 6" by cleaning out channel. Small brook could then be seen coming out through rocks. 1' deep silt where brook meets culvert stream. Most brook water is not from canal.


LONGITUDINAL SECTION
Scale 1"=8'
For details of Drain Cover see sh. No. 64
48" C I Pipe
Edges of 3rd. Class Paving to be protected by a course of stone at least 12 inches deep.
Payment therefor to be made as 3rd Class stone paving
2nd cl paving on 6" of lining
PLAN
ELEVATION OF INLET
ELEVATION SOUTH CUT-OFF WALL
3rd cl concrete
Approx. Original Surface
BORINGS
Clay Soil
Loam
Gravel
Stony Soil
ELEVATION NORTH CUT-OFF WALL
Scale 1"=8
ELEVATION OF OUTLET
2nd cl paving on 6" of lining
SECTION C-C
2nd Cl. Concrete
3rd Cl Concrete
SYMBOLS
Sheeting and bracing to be used in excavating through old banks unless otherwise directed by the Eng.
Length of concrete cutoff walls may be varied by the Engineer to correspond to excavation lines.
LAYOUT PLAN
Ditch to be cleaned out for about 100' from here
Notes. The elevations of bottom of structures shown on this drawing are approximate only, and may be ordered by the Engineer to be at any elevation or of any dimensions necessary to give a proper foundation
Extra precaution should be taken to secure proper foundation under headwalls
Wherever practicable, excavation for trunk of culvert to be made only to neat lines and under such conditions concrete to be deposited without backforms.
All exposed edges of concrete to be rounded to a radius of 1 inch unless otherwise shown
Edges and bottoms of slopes of 2nd class paving to be protected by a course of stone at least 18 inches in depth and payment to be made therefor as 2nd Class paving.
The exact limits and elevation of paving to be determined by the Engineer
For detail of cast iron drain cover see sheet No. 64
Contract No. 62.
Erie Canal
Section 10
Between west line of Monroe County and Eagle Harbor
CULVERT AT STA ~~3997+94~~ 3998+40
OLD CULVERT NO. 68
Scales as indicated
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
38



The bases of structures shown on this plan shall be considered as approximate only and may be ordered by the Engineer to be at any elevation or of any dimensions necessary to give a proper foundation.
Cover of culvert to be classed as 2nd cl. reinforced concrete. Cut off walls to be classed as 3rd cl concrete. All other masonry shown on this plan to be classed as 2nd cl. concrete.
Exposed edges of concrete to be rounded to a radius of 1" unless otherwise shown.
The exact limits and elevations of paving are to be determined by the Engineer.
Edges of 2nd. cl paving to be protected by a course of stone at least 18" deep. Payment therefor to be made as 2nd Cl. Stone Paving
Edges of 3rd cl paving to be protected by a course of stone at least 12" deep. Payment therefor to be made as 3rd Cl. Stone Paving
Length of concrete cut off walls may be varied by the Engineer to correspond with Excavation Lines.

Contract No. 62.

Erie Canal — Section 10

Between west line of Monroe County and Eagle Harbor.

CULVERT AT STA. ~~4072+00.3~~ 4073+13

OLD CULVERT NO. 69

Scales as indicated

Examined and approved
May 7, 1910
Wm B Landreth
Special Deputy State Engineer.

Culvert #70 (Dive)
178' of 3'9" X 3'9" Concrete Box
Not Inspected

Exit

Headwall and wingwall in good condition. Scaling and a few cracks at low end of right wingwall. No water flow. 40' of garden hose could syphon all culvert water down into an abandoned quarry.

Culvert #71 (Dive)
179' of Triple 7'8" Wide X 4' High Concrete Boxes
Not Inspected

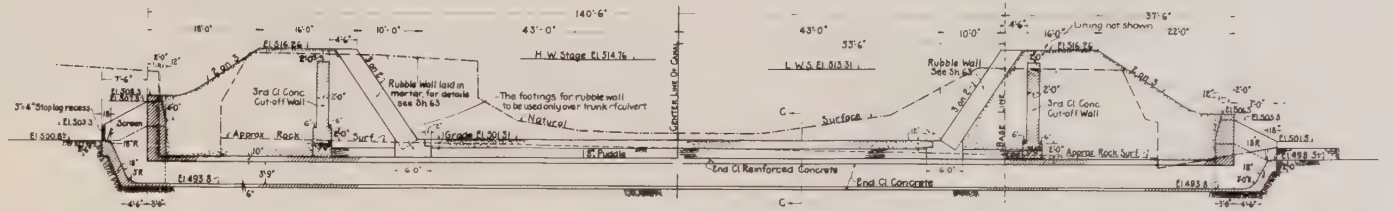
Exit

The 3 exits for this culvert are located under the Brockville Weir and Waste Gate. Stones and debris were partially plugging exits.

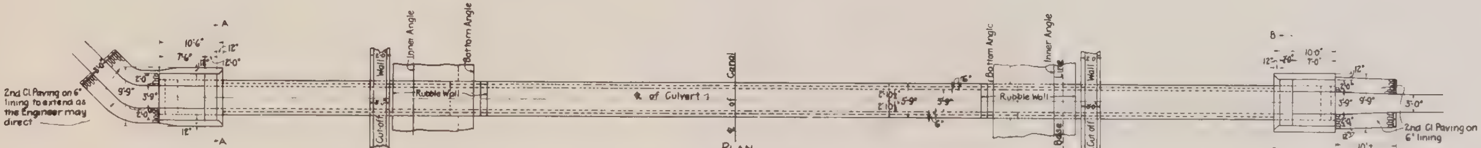
Culvert #72 (Dive)
194' of Twin 42" Cast Iron Pipe
Not Inspected

Exit

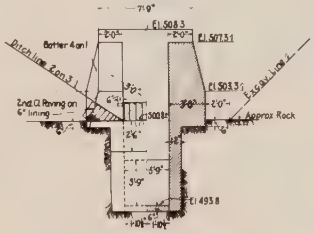
Headwall and left wingwall in good condition. Right wingwall in fair to good condition with low end partially scaled away.
1 active syphon.



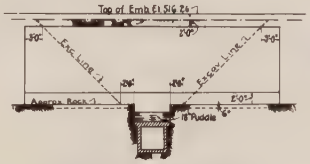
LONGITUDINAL SECTION
Scale 1"=8'
(Reinforcement not shown.)



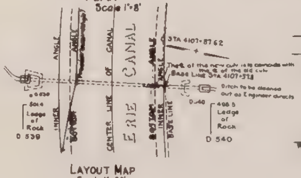
PLAN
Scale 1"=8'



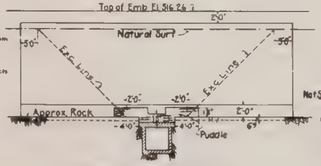
HALF ELEVATION-HALF SECT A-A
Scale 1"=4'
SOUTH END



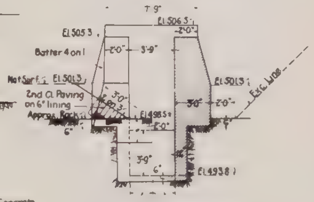
ELEVATION OF SOUTH CUT-OFF WALL
SHOWING ALSO SECTION OF PUDDLE OVER TRUNK
Scale 1"=8'



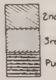
LAYOUT MAP
Scale 1"=50'



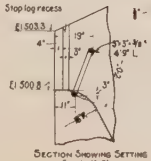
ELEVATION OF NORTH CUT-OFF WALL
SHOWING ALSO SECTION OF PUDDLE OVER TRUNK
Scale 1"=8'



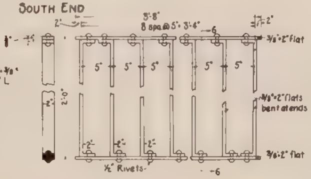
HALF ELEVATION-HALF SECT B-B
Scale 1"=4'
NORTH END



SYMBOLS



SECTION SHOWING SETTING
Scale 1"=2'



Scale 1"=8'

DETAILS OF SCREEN

Screen to be painted as per bridge specifications
Screen to be fastened to angle with 3/8" chain and approved lock
Payment for lock and chain to be made as for Structural Steel

NOTES

The bases of structures shown on this plan shall be considered as approximate only and may be ordered by the Engineer to be at any elevations or of any dimensions necessary for a proper foundation

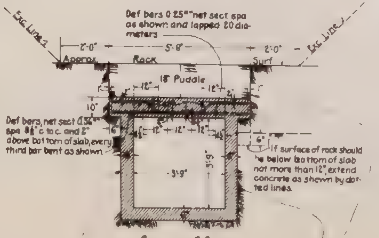
Cover of culvert to be classed as 2nd. Cl. Reinforced Concrete Cut-off walls to be classed as 3rd. Cl Concrete. All other masonry shown on this plan except the rubble slope walls to be classed as 2nd Cl Concrete

Exposed edges of concrete to be rounded to a radius of 1" unless otherwise shown

The exact limits and elevations of paving are to be determined by the Engineer

Edges of 2nd. Cl Paving to be protected by a course of stone at least 18" deep. Payment to be made therefor as 2nd Cl Stone Paving

Length of concrete cut-off walls may be varied by the Engineer to correspond with excavation lines



SECTION C-C
Scale 1"=2'

These surfaces to be channeled - see Special Specifications

Contract No. 62.

Erie Canal **Section 10**

Between west line of Monroe County and Eagle Harbor.

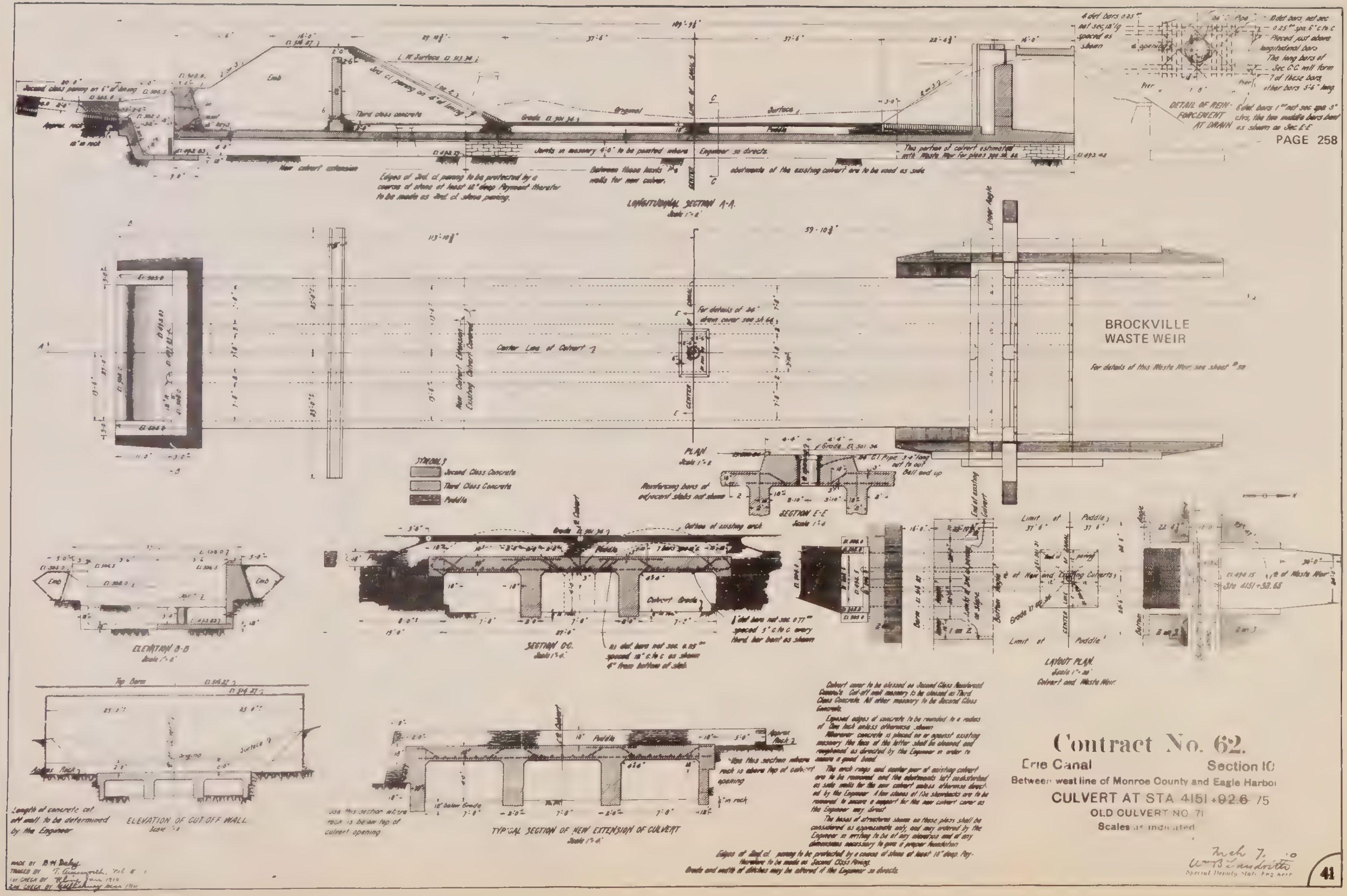
CULVERT AT STA. ~~4107+37.8~~ 4106+98

OLD CULVERT NO. 70

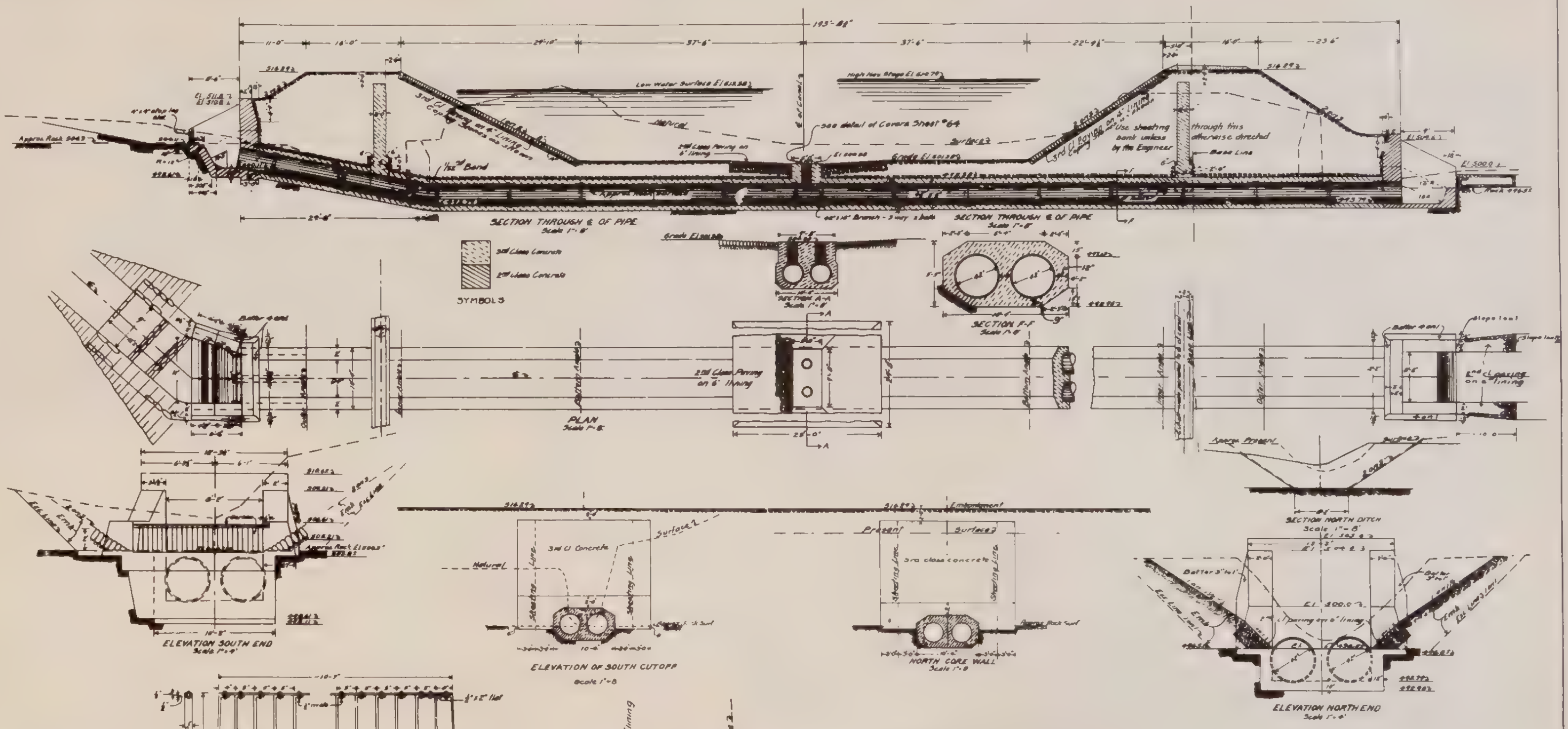
Scales as indicated

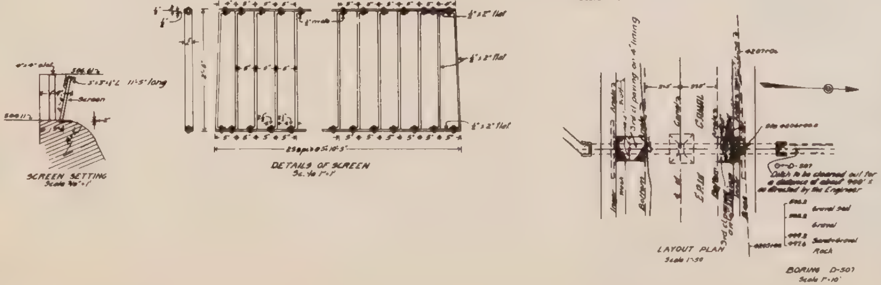
Examined and approved
1910
Wm. B. Landreth
Special Deputy State Engineer.

MADE BY Apr 1910
TRACED BY May 3, 1910
1ST CHECK BY
2ND CHECK BY 5-2-10



LONGITUDINAL SECTION A-A.
Scale 1"=8'
Second class paving on 6" of lining
Third class concrete
Original
Surface
Puddle
Grade El. 501.34
Joints in masonry 4'-0" to be pointed where Engineer so directs.
This portion of culvert estimated with Waste Weir for plans see sh. 60.
New culvert extension
Edges of 2nd. cl. paving to be protected by a course of stone at least 12" deep. Payment therefor to be made as 2nd. cl. stone paving.
Between these limits walls for new culvert.
abutments of the existing culvert are to be used as side
DETAIL OF REINFORCEMENT AT DRAIN
PLAN
Scale 1"=8'
Center Line of Culvert
New Culvert Extension
Existing Culvert Contract
For details of 36" drain cover see sh. 66.
BROCKVILLE
WASTE WEIR
For details of this Waste Weir see sheet 59
SYMBOLS
Second Class Concrete
Third Class Concrete
Puddle
SECTION E-E
Scale 1"=4'
Reinforcing bars at adjacent slabs not shown
ELEVATION B-B
Scale 1"=8'
SECTION C-C.
Scale 1"=4'
Outline of existing arch
Culvert Grade
LAYOUT PLAN.
Scale 1"=40'
Culvert and Waste Weir.
Limit of Puddle
Center Line of New and Existing Culverts
Sta. 4151+93.65
ELEVATION OF CUT-OFF WALL
Top Berm
Approx. Rock
Length of concrete cut-off wall to be determined by the Engineer
TYPICAL SECTION OF NEW EXTENSION OF CULVERT
Scale 1"=4'
Use this section where rock is above top of culvert opening
Use this section where rock is below top of culvert opening
Culvert cover to be classed as Second Class Reinforced Concrete. Cut-off wall masonry to be classed as Third Class Concrete. All other masonry to be Second Class Concrete.
Exposed edges of concrete to be rounded to a radius of One Inch unless otherwise shown.
Wherever concrete is placed on or against existing masonry the face of the latter shall be cleaned and roughened as directed by the Engineer in order to ensure a good bond.
The arch rings and center pier of existing culvert are to be removed, and the abutments left undisturbed as side walls for the new culvert unless otherwise directed by the Engineer. A few stones of the skewbacks are to be removed to secure a support for the new culvert cover as the Engineer may direct.
The bases of structures shown on these plans shall be considered as approximate only, and may ordered by the Engineer in writing to be at any elevation and of any dimensions necessary to give a proper foundation.
Edges of 2nd. cl. paving to be protected by a course of stone at least 18" deep. Payment therefor to be made as Second Class Paving.
Grade and width of ditches may be altered if the Engineer so directs.
Contract No. 62.
Erie Canal Section 10
Between west line of Monroe County and Eagle Harbor
CULVERT AT STA 4151+92.6 75
OLD CULVERT NO. 71
Scales as indicated
Special Deputy State Engineer
MADE BY B.H. Daley
TRACED BY
1st CHECK BY
2nd CHECK BY





Edges of 3rd. Class Paving are to be protected by a course of stone at least 18 inches deep. Payment therefor to be made as 3rd. Class stone paving.

GENERAL NOTES

Exposed edges of structures are to be rounded to a radius of 1"

The exact limits and elevations of paving are to be determined by the Engineer. Edges of 2nd. Cl. Paving are to be protected by a course of stone at least 18" in depth. Payment to be made therefor as 2nd class paving.

The bases of structures shown on the plans shall be considered as approximate only, and may be ordered by the Engineer to be at any elevation or of any dimensions necessary to give a proper foundation.

Length of cutoff walls may be varied by the Engineer to correspond with excavation lines.

Where possible, excavation to be made to neat lines of concrete, and in such cases the concrete is to be deposited without back forms.

2-18" C.I. drain covers shall be provided as shown, payment for same shall be made at the contract price for C.I. Pipe and Specials. Covers to be placed and calked with clay.

Screen to be painted as per bridge specifications.

Screen to be fastened to angle by 3/8" chain and approved lock.

Payment for lock and chain to be made at the contract price for structural steel.

Contract No. 62.

Erie Canal — Section 10

Between west line of Monroe County and Eagle Harbor

CULVERT AT STA. ~~4206+00~~ 4205+53

OLD CULVERT NO. 72

Scales as indicated

MADE BY E. G. Rayner Jan.
TRACED BY [illegible] 1-5-10
1st CHECK BY J. Q. G. 1-24-10
2nd CHECK BY [illegible]

Wm. B. Landreth
Special Dep. State Engineer

Culvert #73 (Dive) 205' of 3'9" X 3'9"
Concrete Box
Not Inspected

Exit
Headwall and wingwalls in good condition. Water was backed up by orchard pond. 1 syphon

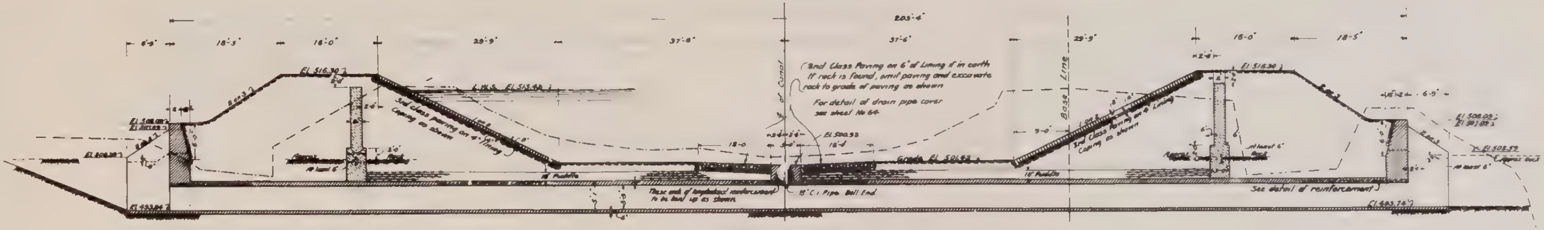
Culvert exit is at right center of orchard pond.

Culvert #73½ (Double Dive) 183' of 36"
Cast Iron Pipe
Not Inspected

Exit
Headwall and wingwalls in good condition. Culvert well filled with debris.

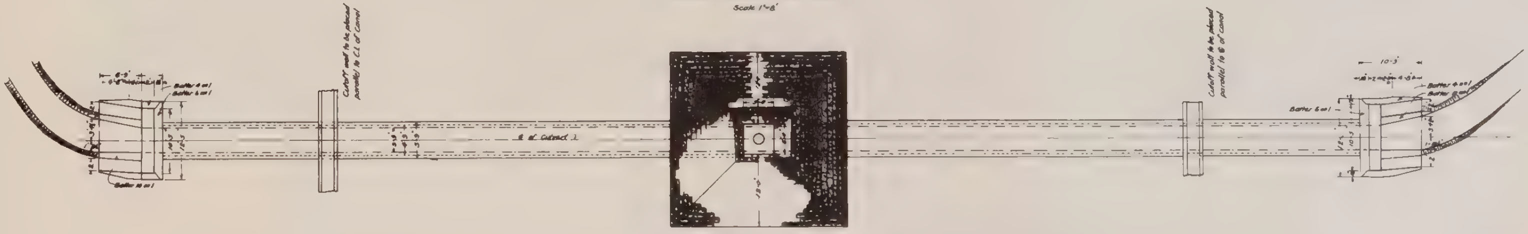
Culvert #74 (Dive) 205' of 3'9" X 3'9"
Concrete Box
Not Inspected

Exit
Headwall and wingwalls in good condition. Culvert well filled with debris.



LONGITUDINAL SECTION

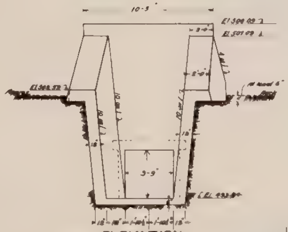
Scale 1"=8'



PLAN

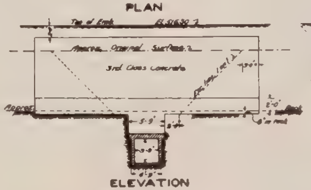
Scale 1"=8'

PLAN



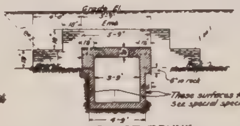
ELEVATION
SOUTH HEAD WALL

Scale 1"=4'

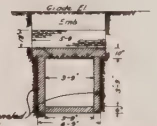


ELEVATION
CUTOFF WALL

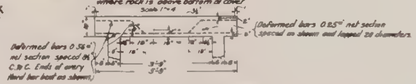
Scale 1"=8'



SECTION OF TRUNK
where rock is not more than 18 feet below bottom of cover
Scale 1"=4'

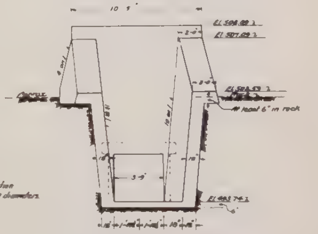


SECTION OF TRUNK
where rock is above bottom of cover
Scale 1"=4'



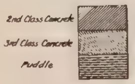
DETAIL OF REINFORCEMENT

Scale 1"=2'

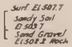


ELEVATION
NORTH HEAD WALL

Scale 1"=4'

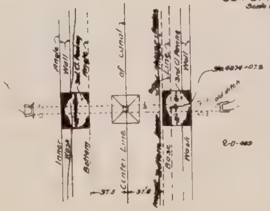


SYMBOLS



BORINGS

Scale 1"=10'



LAYOUT

Scale 50'=1"

Notes The bases of structures shown on this plan shall be considered as approximate only, and may be ordered by the Engineer to be at any elevation or of any dimensions necessary to give a proper foundation.

Cover of culvert to be classed as second class reinforced concrete. Cutoff walls to be classed as third class concrete. All other masonry shown on this plan to be classed as second class concrete. Exposed edges of concrete to be rounded to a radius of one inch unless otherwise shown.

The exact limits and elevations of paving are to be determined by the Engineer. Edges of second class paving to be protected by a course of stone at least 18 inches deep. Payment therefor to be made as 2nd class stone paving.

Edges of 3rd class paving to be protected by a course of stone at least 12 inches deep. Payment therefor to be made as 3rd class stone paving.

Length of concrete cutoff walls may be varied by the Engineer to correspond with excavation lines.

Contract No. 62.

Erie Canal Section 10

Between west line of Monroe County and Eagle Harbor.

CULVERT AT STA. ~~4274+07.2~~ 4273+52

OLD CULVERT NO. 78

Scales as indicated

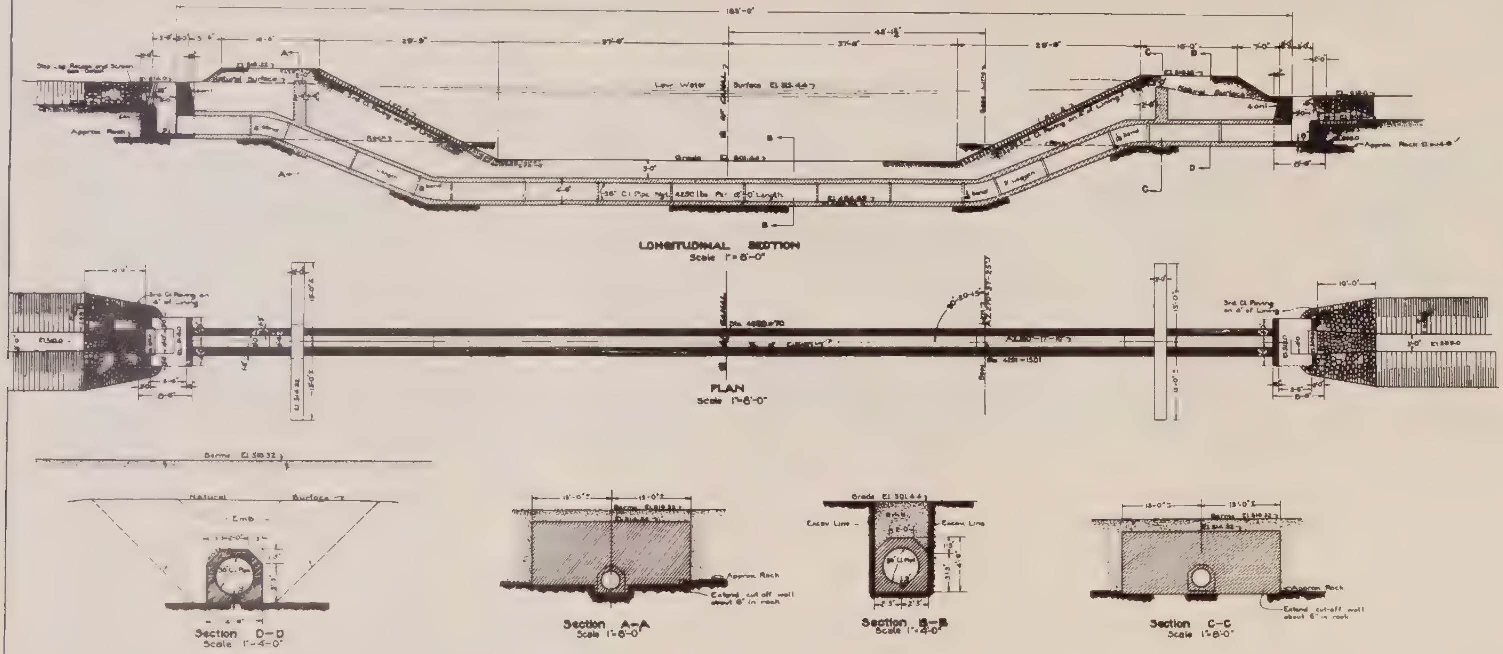
Examined and approved

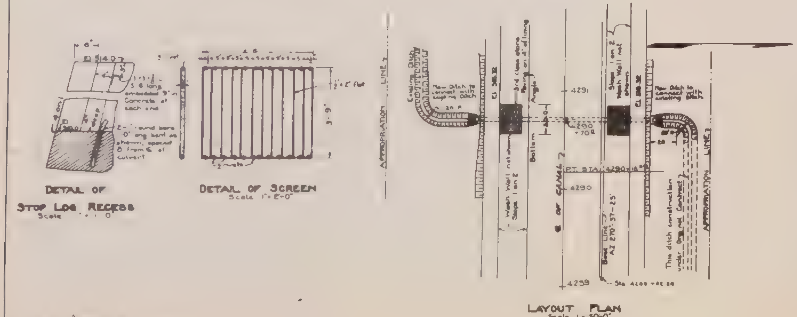
Mch 7 1910

Wm B Landreth

Special Deputy State Engineer.

MADE BY E. G. Raynor May 1910
TRACED BY C. O. Burns 5-30-10
1st CHECK BY [illegible]
2nd CHECK BY [illegible] 5-2-10





MADE BY
TRACED BY
1ST CHECK BY
2ND CHECK BY

Notes.

All exposed edges of concrete to be rounded to radius of 1".

Masonry in culvert casing and cut-off walls to be 3rd. Cl concrete. All other masonry shown on this sheet to be 2nd Cl concrete.

The exact limits and elevations of Paving are to be determined by the Engineer.

The bases of structures shown on plans, shall be considered as approximate only, and may ordered by the Engineer to be at any elevation or of any dimensions necessary to give a proper foundation.

Length of Cut-off walls may be varied by the Engineer to correspond to excavation lines.

Where possible, excavation to be made to neat lines of Concrete and in such cases the Concrete is to be deposited without backforms.

Screen to be painted as per bridge specifications.

Screen to be fastened to angle by $\frac{3}{8}$" chain and approved lock, payment thereof to be made at Contract price for structural steel.

The ditch to be 3'-0" bottom width, Side slopes, 1 on $1\frac{1}{2}$, to be protected with 3rd Class Paving as shown.

Edges of 3rd Cl. Paving to be protected by a course of stone 12" deep and payment is to be made for same at contract price for 3rd Cl. Paving.

CULVERT NO. 73½

Contract No. 62.

ALTERATION NO. 4

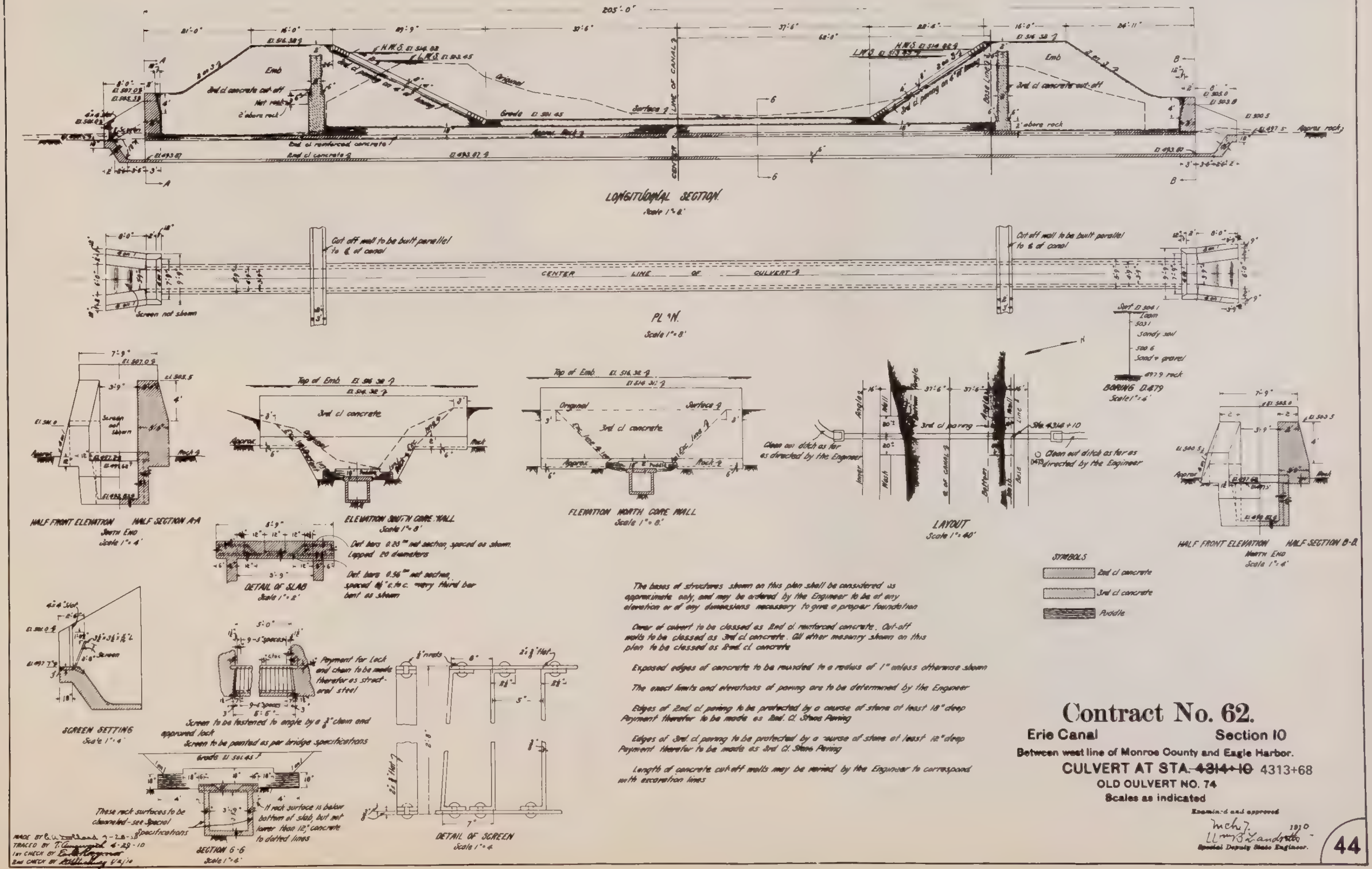
Erie Canal — Section 10

DETAIL PLANS OF NEW CULVERT AT CENETR LINE. STA. 4290 + ~~70~~ 73

Scales as indicated

Examined and approved
H. D. Alexander
Special Resident Engineer
January 31st 1913

Examined and approved
February 11, 1913
Alex. E. Kastl
Special Deputy State Engineer



The bases of structures shown on this plan shall be considered as approximate only, and may be ordered by the Engineer to be at any elevation or of any dimensions necessary to give a proper foundation

Barrel of culvert to be classed as 2nd cl. reinforced concrete. Cut-off walls to be classed as 3rd cl. concrete. All other masonry shown on this plan to be classed as 2nd cl. concrete

Exposed edges of concrete to be rounded to a radius of 1" unless otherwise shown

The exact limits and elevations of paving are to be determined by the Engineer

Edges of 2nd. cl. paving to be protected by a course of stone at least 18" deep. Payment therefor to be made as 2nd. Cl. Stone Paving

Edges of 3rd. cl. paving to be protected by a course of stone at least 12" deep. Payment therefor to be made as 3rd Cl. Stone Paving

Length of concrete cut-off walls may be varied by the Engineer to correspond with excavation lines

MADE BY C. W. Dollard 3-28-10
TRACED BY T. Ämmerich 4-29-10
1st CHECK BY E. A. Rogers
2nd CHECK BY [illegible] 5/4/10

Contract No. 62.

Erie Canal **Section 10**

Between west line of Monroe County and Eagle Harbor.

CULVERT AT STA. ~~4314+10~~ 4313+68

OLD CULVERT NO. 74

Scales as indicated

Examined and approved
1910
[signature]
Special Deputy State Engineer.

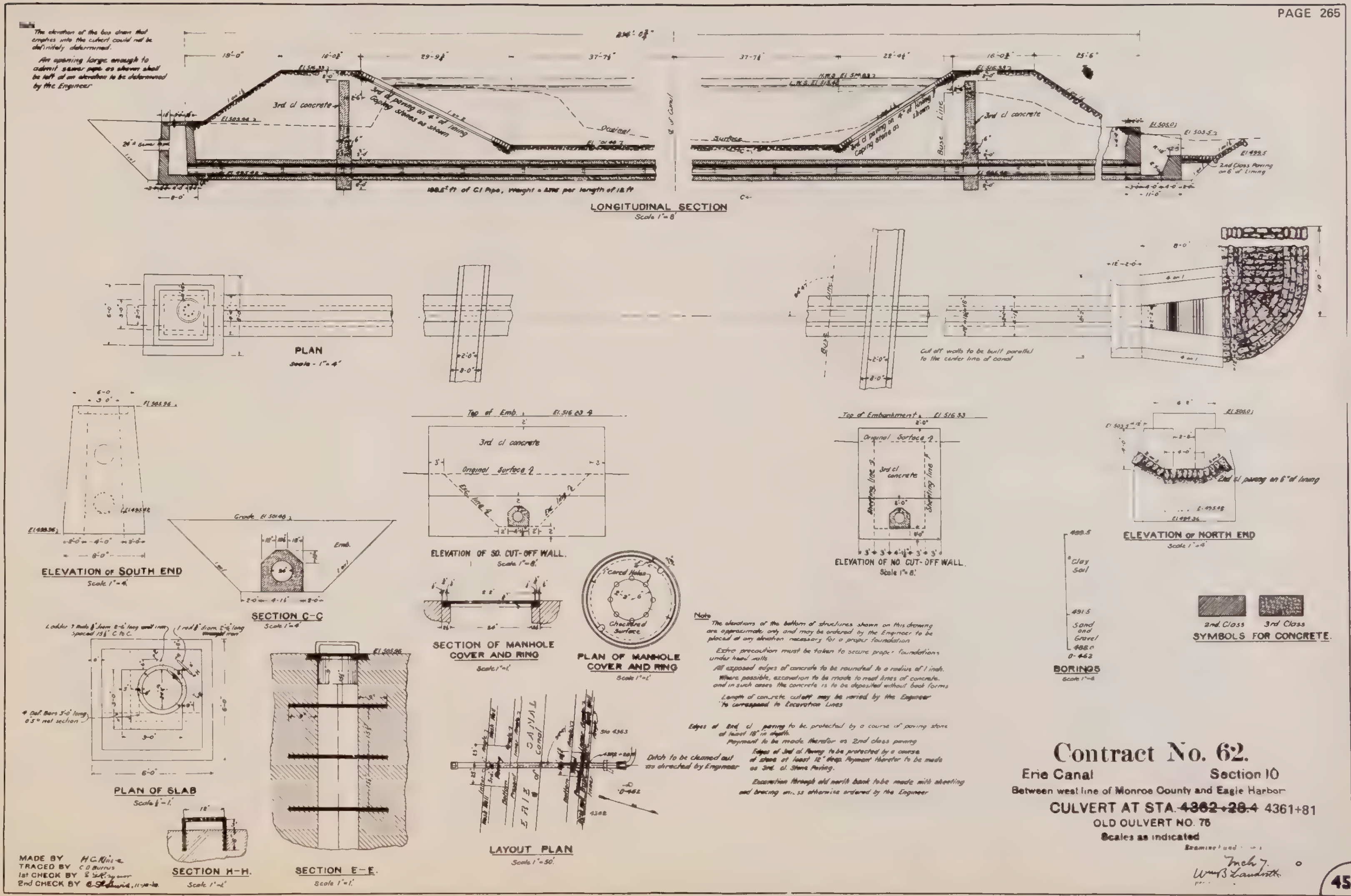
Culvert #75 (Dive) 204' of 24" Cast Iron Pipe
Not Inspected

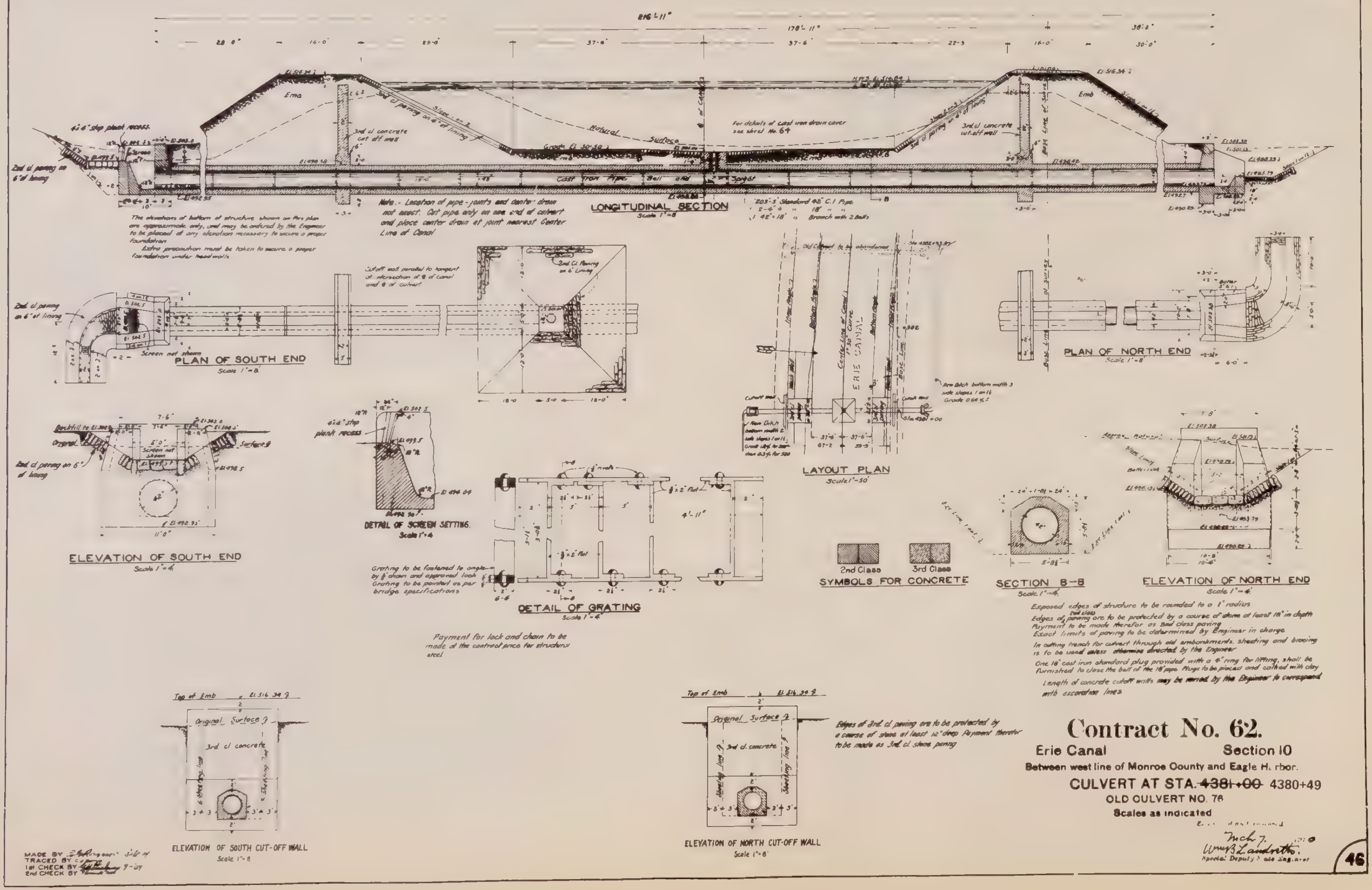
Exit
Headwall and wingwalls in good condition. Clean water flows into a 12" pipe and heads underground toward house. Culvert well filled with leaves and debris. Board fencing and pipe seems to indicate that water is used by land owner (Kirby).

Small well found about 100' east of Culvert #75 at the toe of the north embankment. Water level was 3' below ground. No flow noticed.

Culvert #76 (½ Dive) 217' of 42" Cast Iron Pipe
Not Inspected

Exit
Headwall and wingwalls in good condition. End of left wingwall broken off. Pipe half full of water.


LONGITUDINAL SECTION
Scale 1" = 8'
3rd cl concrete
Original Surface
PLAN
ELEVATION OF SOUTH END
SECTION C-C
ELEVATION OF SO. CUT-OFF WALL.
ELEVATION OF NO. CUT-OFF WALL.
ELEVATION OF NORTH END
SECTION OF MANHOLE COVER AND RING
PLAN OF MANHOLE COVER AND RING
PLAN OF SLAB
SECTION H-H.
SECTION E-E.
LAYOUT PLAN
BORINGS
Clay Soil
Sand and Gravel
2nd Class
3rd Class
SYMBOLS FOR CONCRETE.
Cut off walls to be built parallel to the center line of canal
Ditch to be cleaned out as directed by Engineer
Note
The elevations of the bottom of structures shown on this drawing are approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.
Extra precaution must be taken to secure proper foundations under head walls
All exposed edges of concrete to be rounded to a radius of 1 inch.
Where possible, excavation to be made to neat lines of concrete, and in such cases the concrete is to be deposited without back forms
Contract No. 62.
Erie Canal
Section 10
Between west line of Monroe County and Eagle Harbor
CULVERT AT STA. 4362+28.4 4361+81
OLD CULVERT NO. 75
Scales as indicated
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
45


LONGITUDINAL SECTION
Scale 1"=8'
Cast Iron Pipe Bell and Spigot
Natural Surface
3rd cl concrete cut off wall
Emb
Note.- Location of pipe-joints and center drain not exact. Cut pipe only on one end of culvert and place center drain at joint nearest Center Line of Canal
For details of cast iron drain cover see sheet No. 64
PLAN OF SOUTH END
Scale 1"=8'
Screen not shown
2nd cl paving on 6" of lining
PLAN OF NORTH END
Scale 1"=8'
LAYOUT PLAN
Scale 1"=50'
ERIE CANAL
ELEVATION OF SOUTH END
Scale 1"=4'
DETAIL OF SCREEN SETTING
Scale 1"=4'
DETAIL OF GRATING
Scale 1"=4'
Grating to be fastened to angle by ⅜" chain and approved lock
Grating to be painted as per bridge specifications
Payment for lock and chain to be made at the contract price for structural steel
2nd Class
3rd Class
SYMBOLS FOR CONCRETE
SECTION B-B
Scale 1"=4'
ELEVATION OF NORTH END
Scale 1"=4'
Exposed edges of structure to be rounded to a 1" radius
Edges of 2nd class paving are to be protected by a course of stone at least 18" in depth
Payment to be made therefor as 2nd class paving
Exact limits of paving to be determined by Engineer in charge
In cutting trench for culvert through old embankments, sheeting and bracing is to be used unless otherwise directed by the Engineer
Length of concrete cutoff walls may be varied by the Engineer to correspond with excavation lines
Top of Emb
Original Surface
3rd cl concrete
ELEVATION OF SOUTH CUT-OFF WALL
Scale 1"=8'
ELEVATION OF NORTH CUT-OFF WALL
Scale 1"=8'
Edges of 3rd cl paving are to be protected by a course of stone at least 12" deep. Payment therefor to be made as 3rd cl stone paving
Contract No. 62.
Erie Canal
Section 10
Between west line of Monroe County and Eagle Harbor.
CULVERT AT STA. 4381+00 4380+49
OLD CULVERT NO. 76
Scales as indicated
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
Special Deputy State Engineer
46

Culvert #77 135.5' of Twin 12' Wide X 6'3"
High Stone Block Arch and
40.5' of Concrete Arch

Looking South-Exposed Top of Culvert, Apr. 1976
Albion Waste Gate and Weir in background. Area sandbagged off for repairs. Concrete lining over top of culvert has mostly disappeared.

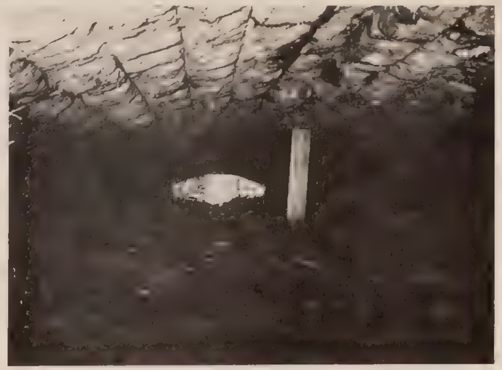
Entrance
Albion Waste Gate and Weir overhead. No airspace existed prior to cleaning of downstream channel. Note stones missing under middle gate in 1976. Compare with 1975 photo in Albion Waste Gate and Weir section.

In the Spring of 1976, water was seen spouting up into the nearly drained canal when the culvert was flowing full. Later, the area above the culvert was sandbagged off and a hole down between stone blocks was found. The downstream channel was then cleaned out so the culvert could be entered and the entrance area was also cleaned of debris. The hole was patched with concrete and the canal filled. In late August, a large quantity of water was seen spouting out a 30-40' long section of the east barrel west wall near the south end. The west barrel could only be entered a short distance from the exit end. It was plugged by a 5-6' diameter tree trunk wedged between the floor and ceiling. On Sept. 15 the waste gates were closed and our first thorough inspection was made.

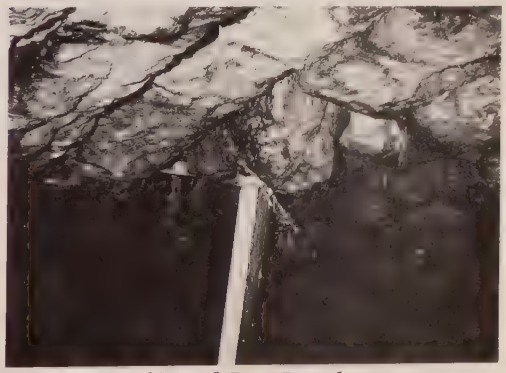
Exit
Headwall and wingwalls in good condition with a few cracks. Only 8" of airspace existed at exit prior to cleaning of downstream channel.

Culvert 77
East Barrel

East Barrel-Looking South From Exit
Concrete arch had a few scattered efflorescent covered cracks. Stones in culvert and in exit channel appeared to be the remains of an old mill that existed at the culvert entrance.

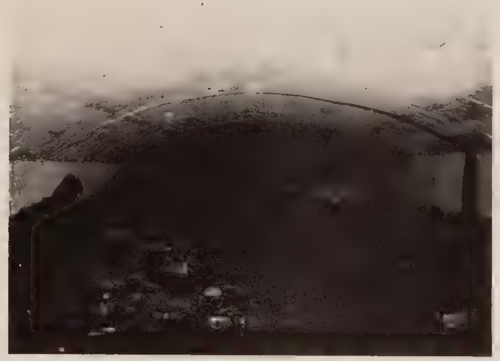


East Barrel-Looking South
Note row of ceiling blocks higher than others. Either the bottom sections of these blocks have fallen off or the blocks were never lowered to correct position.



Ceiling of East Barrel
Large board used to prop up tilted and partially fallen stone block while overhead concrete repairs were made in the Spring of 1976. Two other adjacent stone blocks were partially missing. New concrete was seen high up in joints.

West Wall of East Barrel Near South End
Two weeks prior, a large quantity of water was seen coming through a 30-40' long section of the lower wall joint. All leaks had now stopped.



Plugged West Barrel - Looking South From Exit
Concrete arch had a few scattered
efflorescent covered cracks

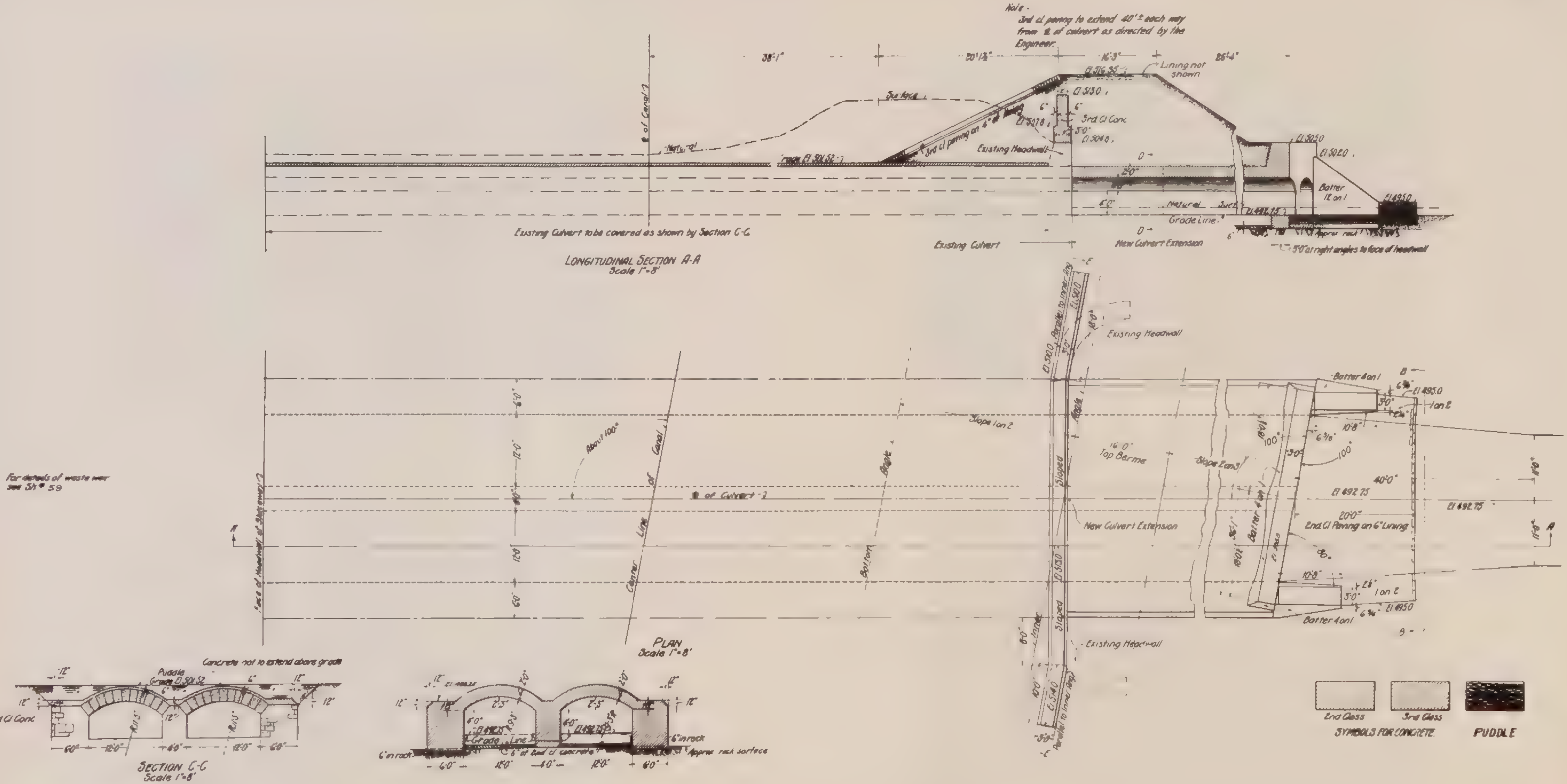
Plugged West Barrel - Looking North
Behind the plug, the culvert floor has filled up with rocks and gravel. Another stone block exists below wall at right. Compare with east barrel wall photo.

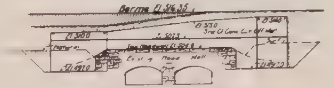
Plugged West Barrel
5-6' diameter tree trunk plugged culvert.
30' or more of debris was piled up behind trunk.

West Barrel - hole 1' square by 1' deep existed in a stone block 3' and 8' in from the entrance. Constant scattered dripping throughout. Drip size streams existed in 3 or 4 areas mainly in south half. Numerous joints open between stones. A few cracked blocks at entrance. Exit plugged.

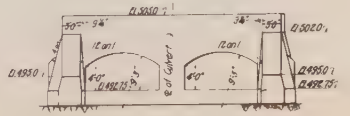
East Barrel - about 6 broken blocks within 10' of the entrance, but only 2 have partially fallen out. One block has slipped down 2". Numerous joints open between blocks. Many constantly dripping streams mainly in south half. Board used to prop up ceiling block while repairs were made. No leaks in area of repair. Heavy leak in west wall seen 2 weeks previous had stopped.

Sections of both barrels, mainly near the entrance, need repair. Work on unplugging the west barrel has been started. Both barrels need cleaning. Both north end concrete arches contained a few cracks, but were still in fair to good condition.





ELEVATION OF CUT-OFF WALL E-E
Scale 1"=16'



FRONT ELEVATION B-B
Scale 1"=8'

GENERAL NOTES

The bases of structures shown on this plan are approximate only and may be ordered by the Engineer to be of any dimensions or at any elevations necessary to give a proper foundation.

All concrete shown on this sheet, except that in Cut-Off wall, to be 2nd Cl Concrete. Concrete in Cut-Off wall to be 3rd Class.

Round all exposed edges of concrete to a 3" radius.

Edges of 2nd Cl Paving to be protected by a course of stone at least 18" deep. Payment therefor to be made as 2nd Cl Paving.

A suitable bond shall be made between new and old culvert sections. Wherever concrete is placed on or against masonry the face of the masonry shall be thoroughly cleaned and roughened to secure a good bond.

Cut-Off wall to be built on top of existing cut-off wall.

Contract No. 62.

Erie Canal Section 10

Between west line of Monroe County and Eagle Harbor

CULVERT AT STA. ~~4411+70~~ 4411+32

OLD CULVERT NO. 77

Scales as indicated

Mch 7. 1910

Henry B. Laedon

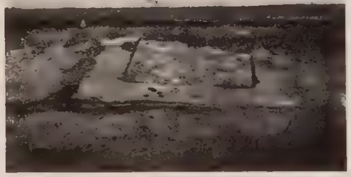
Special Deputy State Engineer

Made By Zoe Daly
Traced By ... February 1910
1st Check By ...
2nd Check By ... Mar. 1910

Culvert #78 (Dive) 216' of 42" Cast Iron Pipe
Not Inspected

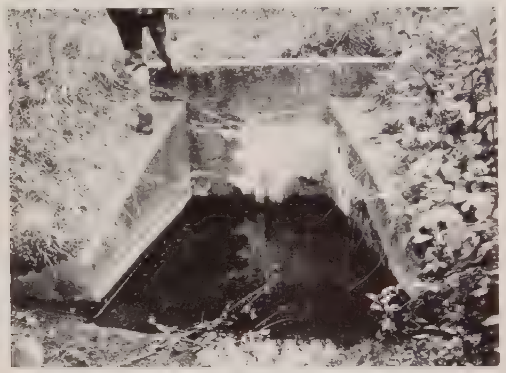
Exit
Headwall and wingwalls in good condition. Pipe half full of silt.

Culvert #79 (Dive) 144' of 30" Cast Iron Pipe
Not Inspected

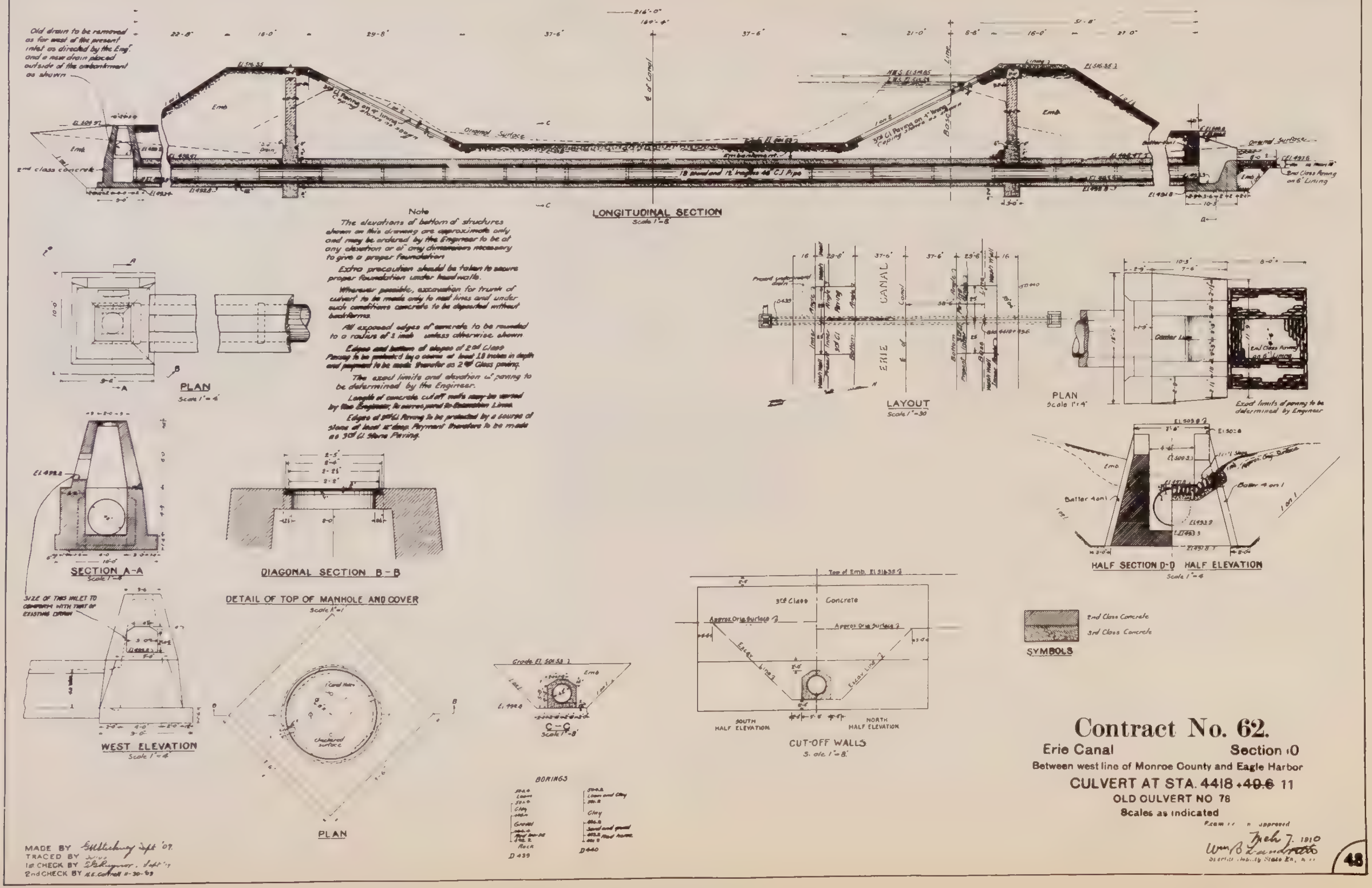


Entrance
Square manhole cover in foreground is entrance. Exit manhole is under car behind telephone pole on north side of canal. This Town of Albion storm sewer was allegedly cleaned out in 1974.

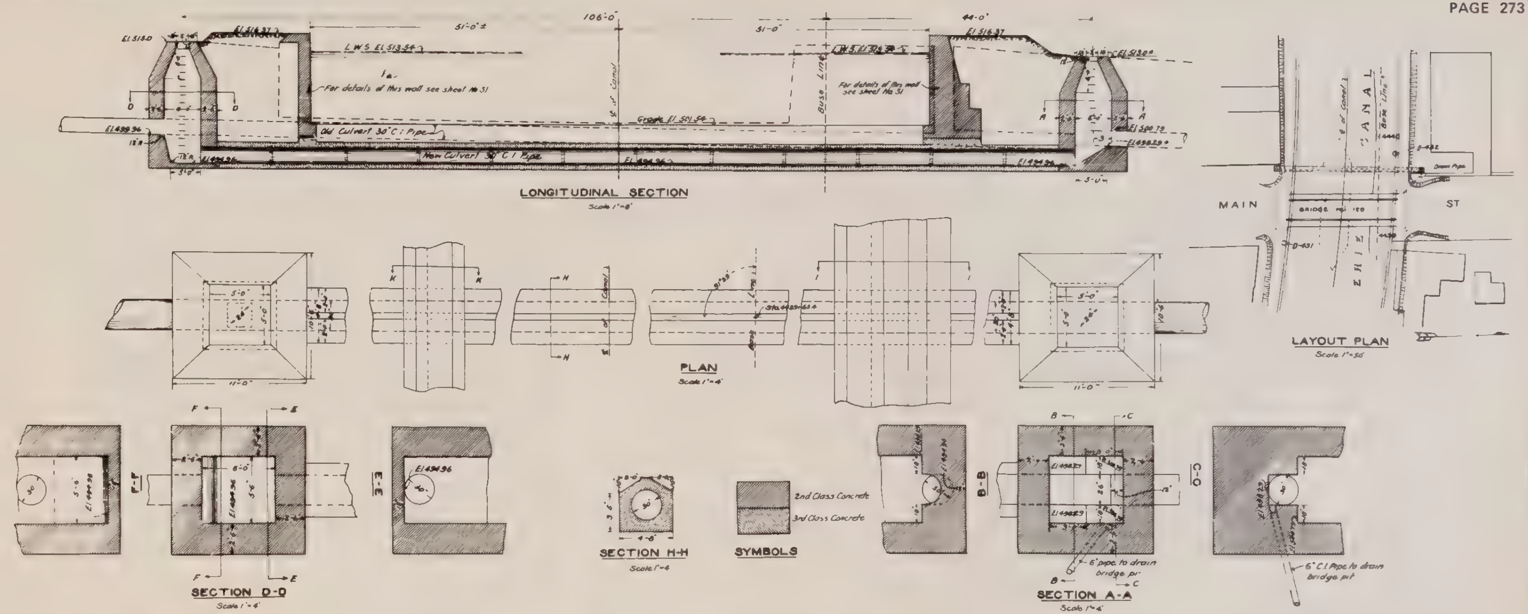
Culvert #80 (Dive) 190' of 42" Cast Iron Pipe
Not Inspected

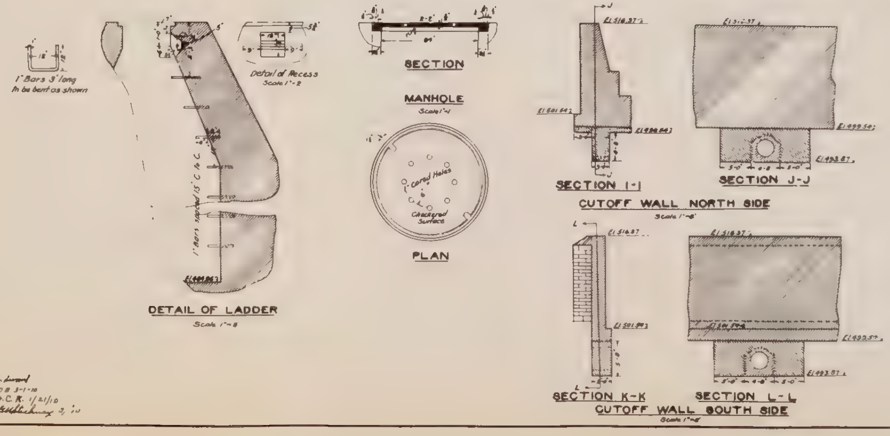


Exit
Headwall and wingwalls in fair condition due to many cracks. Culvert well filled with silt and drainage channel filled with vegetation.



Old drain to be removed as far west of the present inlet as directed by the Eng'r. and a new drain placed outside of the embankment as shown
2nd class concrete
Emb
Original Surface
18 Wood and 12 Inc 48" C.I. Pipe
LONGITUDINAL SECTION
Scale 1"=8'
Note
The elevations of bottom of structures shown on this drawing are approximate only and may be ordered by the Engineer to be at any elevation or of any dimensions necessary to give a proper foundation.
Extra precaution should be taken to secure proper foundation under headwalls.
Wherever possible, excavation for trunk of culvert to be made only to neat lines and under such conditions concrete to be deposited without backforms.
All exposed edges of concrete to be rounded to a radius of 1 inch unless otherwise shown.
Edges and bottom of slopes of 2nd Class Paving to be protected by a course at least 18 inches in depth and payment to be made therefor as 2nd Class paving.
The exact limits and elevation of paving to be determined by the Engineer.
Length of concrete cut off walls may be varied by the Engineer to correspond to Excavation Lines.
Edges of 3rd Cl. Paving to be protected by a course of stone at least 12" deep. Payment therefore to be made as 3rd Cl. Stone Paving.
PLAN
Scale 1"=4'
SECTION A-A
Scale 1"=8'
DIAGONAL SECTION B-B
DETAIL OF TOP OF MANHOLE AND COVER
SIZE OF THIS INLET TO CONFORM WITH THAT OF EXISTING DRAIN
WEST ELEVATION
Scale 1"=4'
PLAN
C-C
Scale 1"=8'
BORINGS
LAYOUT
Scale 1"=30'
ERIE CANAL
PLAN
Scale 1"=4'
Exact limits of paving to be determined by Engineer
HALF SECTION D-D HALF ELEVATION
Scale 1"=4'
Batter 4 on 1
2nd Class Concrete
3rd Class Concrete
SYMBOLS
Top of Emb. El. 516.35
3rd Class Concrete
Approx. Orig. Surface
Excav. Line
SOUTH HALF ELEVATION
NORTH HALF ELEVATION
CUT-OFF WALLS
Scale 1"=8'
Contract No. 62.
Erie Canal
Section 10
Between west line of Monroe County and Eagle Harbor
CULVERT AT STA. 4418 +40.6 11
OLD CULVERT NO 78
Scales as indicated
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
Feb 7. 1910
Wm B Landreth
48





Notes. The bases of structures shown on this plan shall be considered as approximate only, and may be ordered by the Engineer to be of any elevation or of any dimensions necessary to give a proper foundation.

Concrete to be 2nd and 3rd class as shown. All exposed edges to be rounded to a radius of 1" unless otherwise shown.

At the inlet and outlet of culvert, where new culvert joins the old culvert, the Engineer may change elevations if necessary.

Care must be taken to have a good junction between old and new pipes.

Due care must be taken to have the old wall on south side of canal properly supported, and if considered necessary by the Engineer, a concrete footing may be placed under the wall.

The six inch pipe used to drain bridge pit into manhole is to be located by the Engineer and placed as shown.

MADE BY
TRACED BY C.D.B. 3-1-10
1st CHECK BY H.C.R. 1/21/10
2nd CHECK BY

Contract No. 62.

Erie Canal — Section 10

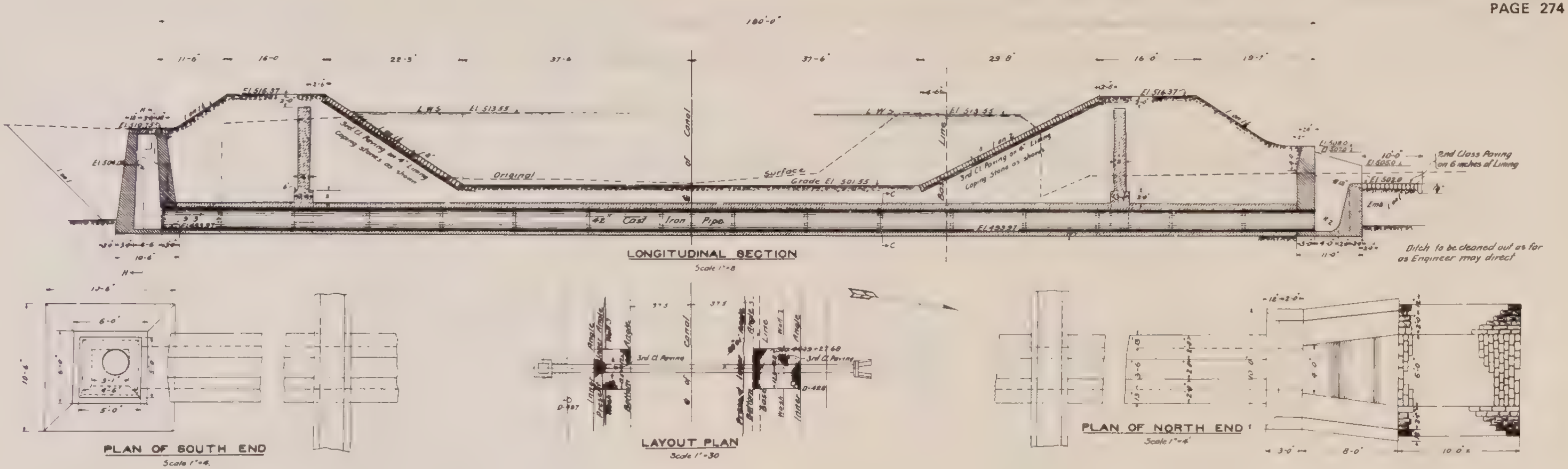
Between west line of Monroe County and Eagle Harbor.

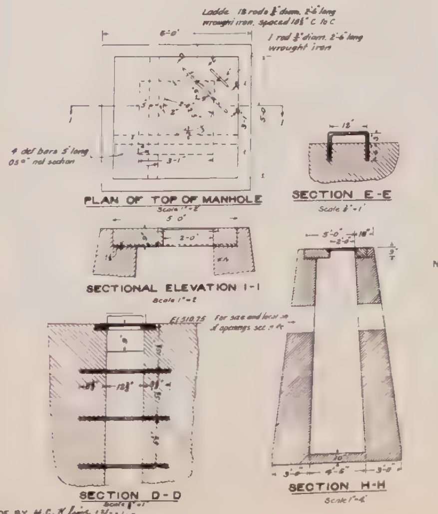
CULVERT AT STA. 4439 ~~+65.4~~ 20

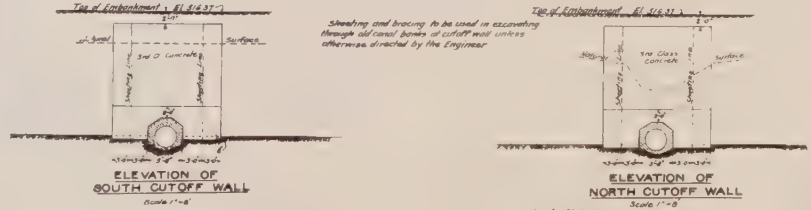
OLD CULVERT NO. 79

Scales as indicated

Examined and approved
Feb 7, 1910
Wm B. Landreth
Special Deputy State Engineer







Notes

The elevations of the bottom of structures shown on this plan shall be considered as approximate only, and may be ordered by the Engineer to be at any elevation or of any dimensions necessary to give a proper foundation

Extra precaution should be taken to secure a proper foundation under headwalls.

2nd Class paving to be laid on 6 inches of lining. Edges of 2nd class paving to be protected by a course of paving stone at least 18" in depth. Payment to be made therefor as 2nd class paving. Limits of paving to be determined by the Engineer.

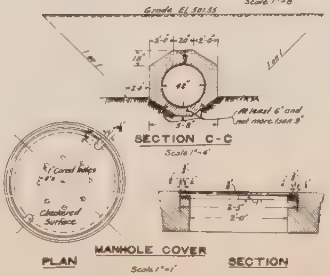
All exposed edges of concrete to be rounded to a radius of 1 inch unless otherwise shown.

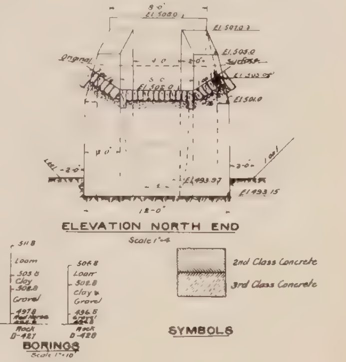
Length of concrete cutoff walls may be varied by the Engineer to correspond with the excavation lines

Where possible, excavation to be made to neat lines of concrete and in such cases the concrete is to be deposited without back forms

Two openings shall be left in the walls of the manhole for the connection of sewers. The size and location of openings to be determined by the Engineer.

Edges of 3rd Class Paving to be protected by a course of stone at least 12 inches deep. Payment therefor to be made as 3rd Class Stone Paving





Contract No. 62

Erie Canal — Section 10

Between west line of Monroe County and Eagle Harbor

CULVERT AT STA. ~~4449+27.7~~ 4448+72

OLD CULVERT NO. 80

Scales as indicated

MADE BY H.C. Klein 12/22/09
TRACED BY C.G.B.
1st CHECK BY
2nd CHECK BY

Culvert #82 (Dive) 195.5' of 60" Cast Iron Pipe
Not Inspected

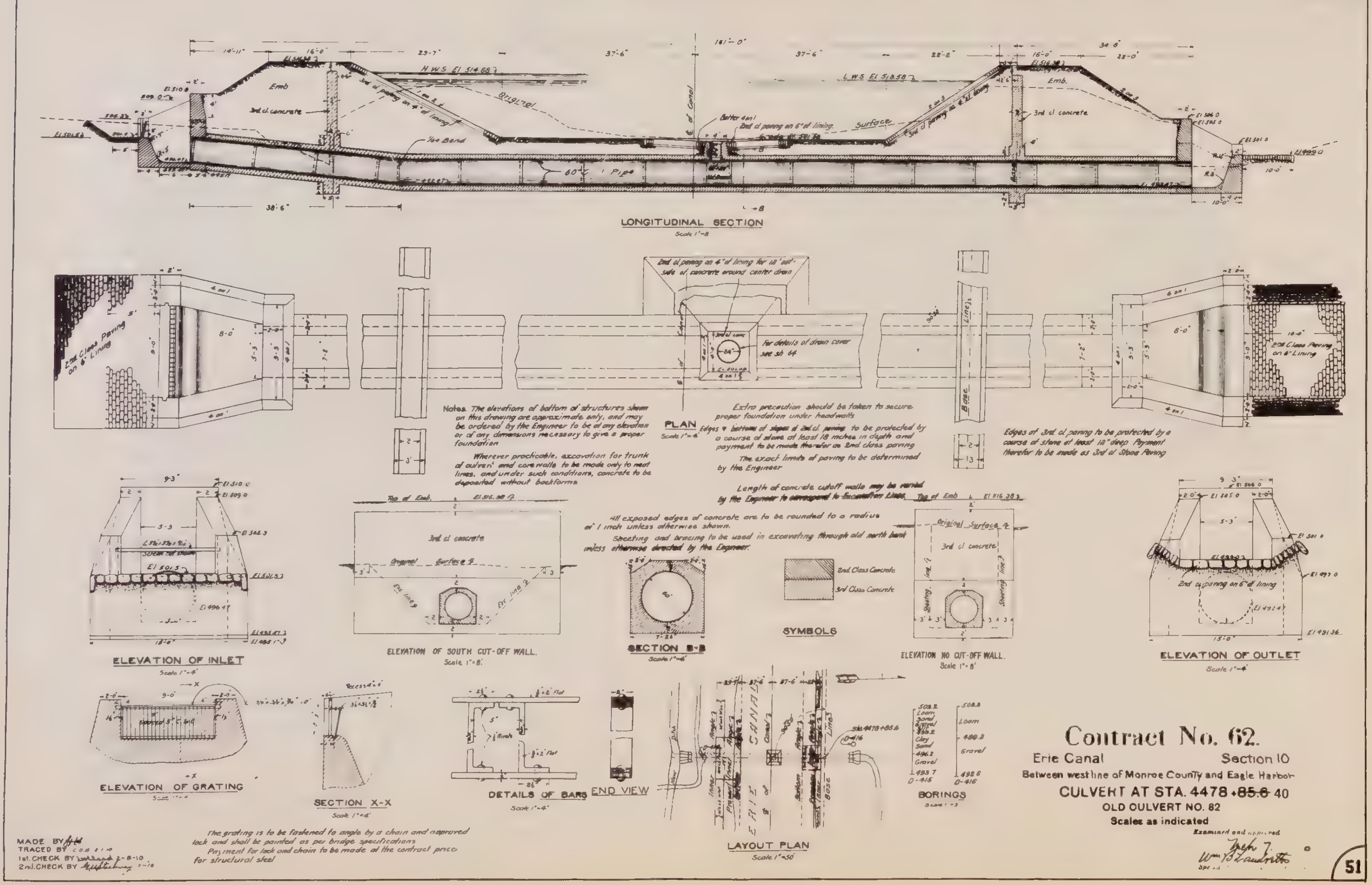
Exit

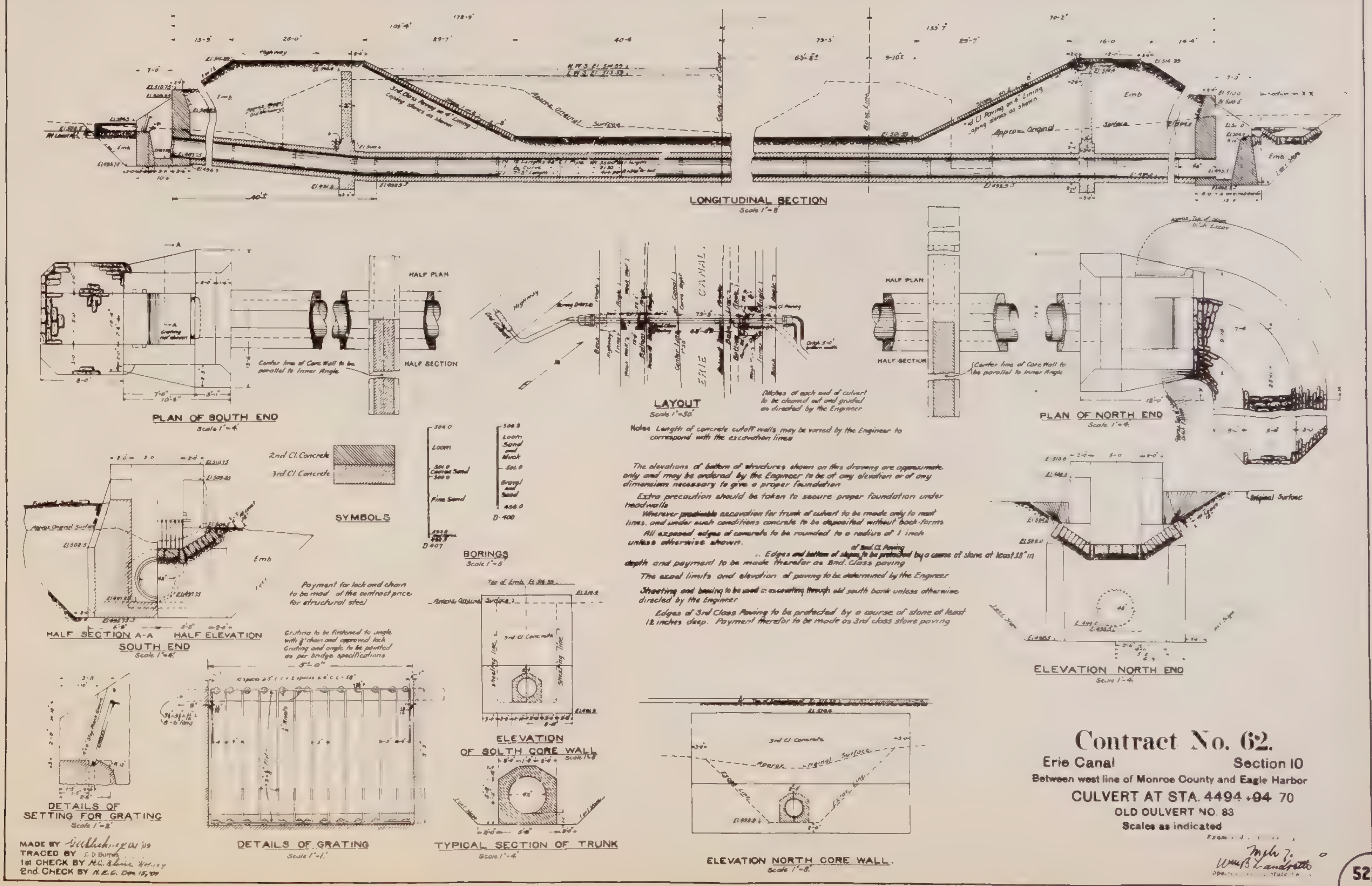
Headwall and wingwalls in good condition above horizontal crack or construction joint. Efflorescent covered cracks in vicinity of crack and end of left wingwall partially scaled away. 7-3" syphons, 3 active.

Culvert #83 (Dive) 243' of 42" Cast Iron Pipe
Not Inspected

Exit

Above the water line, headwall and most of wingwalls in good condition. 6" deep scaling on headwall and wingwalls at water line. Low ends of wingwalls scaling away. 3-3" syphons, 1 active. Note embankment erosion by active syphon behind left wingwall.


LONGITUDINAL SECTION
Scale 1" = 8'
PLAN
Scale 1" = 4'
Notes. The elevations of bottom of structures shown on this drawing are approximate only, and may be ordered by the Engineer to be at any elevation or of any dimensions necessary to give a proper foundation
Wherever practicable, excavation for trunk of culvert and core walls to be made only to neat lines, and under such conditions, concrete to be deposited without backforms
Extra precaution should be taken to secure proper foundation under headwalls
Edges & bottoms of slopes of 2nd cl. paving to be protected by a course of stone at least 18 inches in depth and payment to be made therefor as 2nd class paving
The exact limits of paving to be determined by the Engineer
Length of concrete cutoff walls may be varied by the Engineer to correspond to Excavation Lines
All exposed edges of concrete are to be rounded to a radius of 1 inch unless otherwise shown.
Sheeting and bracing to be used in excavating through old north bank unless otherwise directed by the Engineer.
Edges of 3rd cl. paving to be protected by a course of stone at least 12" deep. Payment therefor to be made as 3rd cl. Stone Paving
ELEVATION OF INLET
ELEVATION OF SOUTH CUT-OFF WALL.
SECTION B-B
2nd Class Concrete
3rd Class Concrete
SYMBOLS
ELEVATION NO CUT-OFF WALL.
ELEVATION OF OUTLET
ELEVATION OF GRATING
SECTION X-X
DETAILS OF BARS
END VIEW
LAYOUT PLAN
BORINGS
The grating is to be fastened to angle by a chain and approved lock and shall be painted as per bridge specifications
Payment for lock and chain to be made at the contract price for structural steel
MADE BY
TRACED BY
1st. CHECK BY
2nd. CHECK BY
Contract No. 62.
Erie Canal
Section 10
Between west line of Monroe County and Eagle Harbor
CULVERT AT STA. 4478 +85.6 40
OLD CULVERT NO. 82
Scales as indicated
Examined and approved


LONGITUDINAL SECTION
Scale 1" = 8'
PLAN OF SOUTH END
Scale 1" = 4'
HALF PLAN
HALF SECTION
Center line of Core Wall to be parallel to Inner Angle
LAYOUT
Scale 1" = 50'
Ditches at each end of culvert to be cleaned out and graded as directed by the Engineer
PLAN OF NORTH END
Scale 1" = 4'
2nd Cl. Concrete
3rd Cl Concrete
SYMBOLS
BORINGS
Scale 1" = 5'
Notes Length of concrete cutoff walls may be varied by the Engineer to correspond with the excavation lines
The elevations of bottom of structures shown on this drawing are approximate only and may be ordered by the Engineer to be at any elevation or of any dimensions necessary to give a proper foundation
Extra precaution should be taken to secure proper foundation under headwalls
Wherever practicable excavation for trunk of culvert to be made only to neat lines, and under such conditions concrete to be deposited without back-forms
All exposed edges of concrete to be rounded to a radius of 1 inch unless otherwise shown.
Edges and bottom of slopes of 2nd Cl. Paving to be protected by a course of stone at least 18" in depth and payment to be made therefor as 2nd. Class paving
The exact limits and elevation of paving to be determined by the Engineer
Sheeting and bracing to be used in excavating through old south bank unless otherwise directed by the Engineer
Edges of 3rd Class Paving to be protected by a course of stone at least 12 inches deep. Payment therefor to be made as 3rd class stone paving
Payment for lock and chain to be made at the contract price for structural steel
HALF SECTION A-A
HALF ELEVATION
SOUTH END
Scale 1" = 4'
Grating to be fastened to angle with 3/8" chain and approved lock. Grating and angle to be painted as per bridge specifications
ELEVATION OF SOUTH CORE WALL
ELEVATION NORTH END
Scale 1" = 4'
DETAILS OF SETTING FOR GRATING
Scale 1" = 2'
DETAILS OF GRATING
Scale 1" = 1'
TYPICAL SECTION OF TRUNK
Scale 1" = 4'
ELEVATION NORTH CORE WALL.
Scale 1" = 8'
Contract No. 62.
Erie Canal
Section 10
Between west line of Monroe County and Eagle Harbor
CULVERT AT STA. 4494 + 70
OLD CULVERT NO. 83
Scales as indicated
MADE BY
TRACED BY
1st CHECK BY
2nd. CHECK BY

Culvert #84 (Dive) 207' of 42" Cast Iron Pipe
Not Inspected

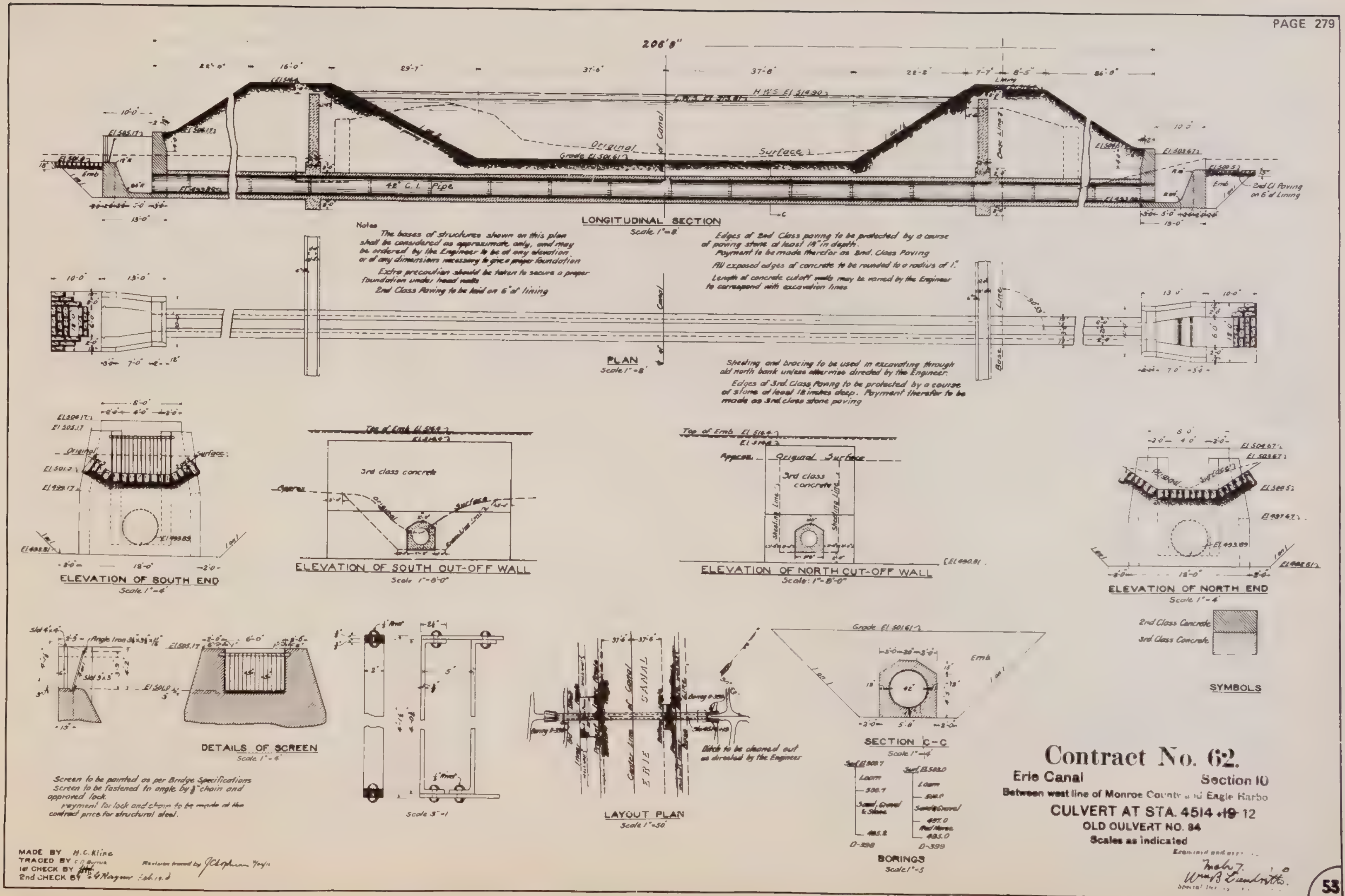
Exit

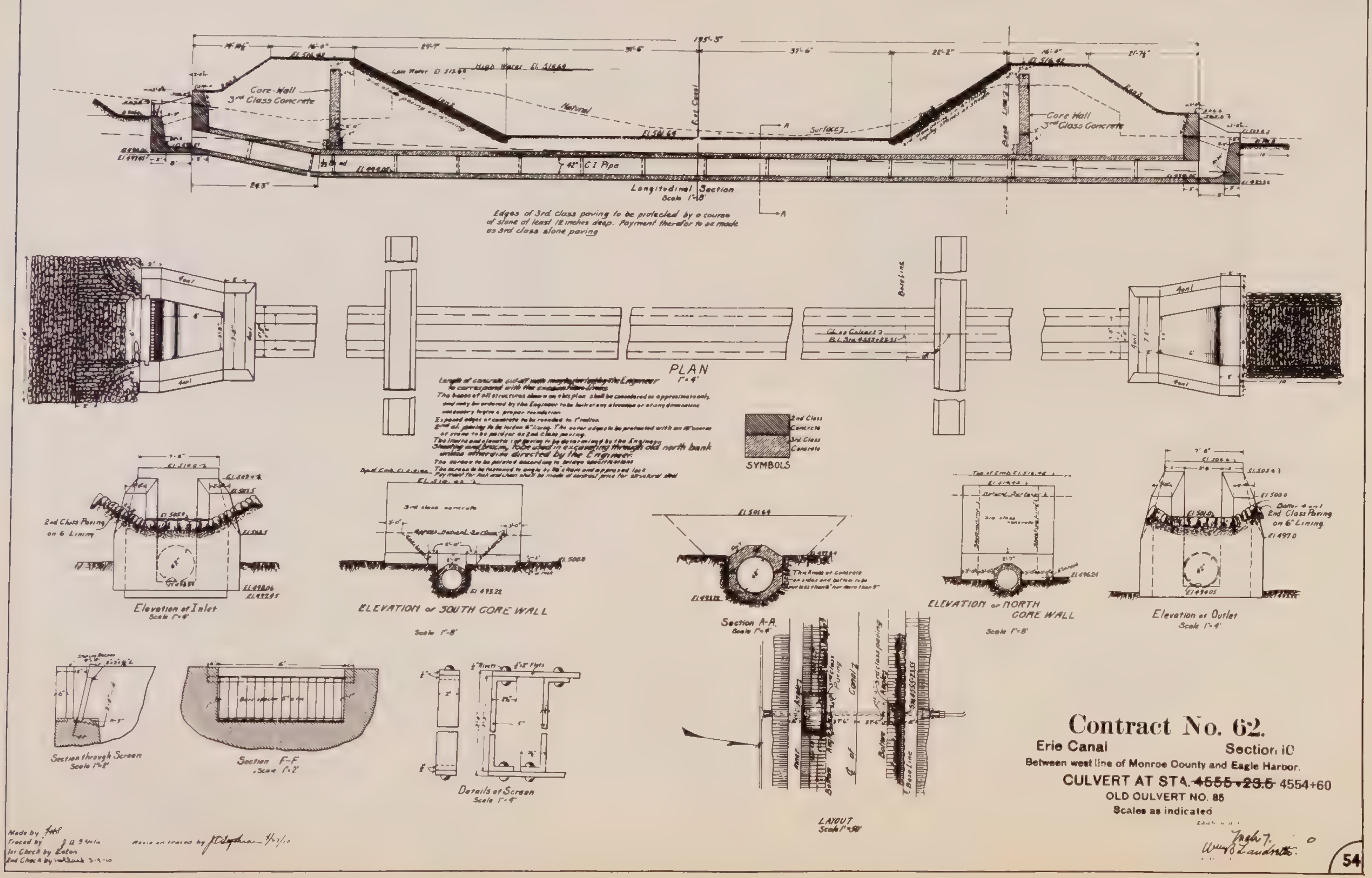
Headwall and wingwalls in fair to poor condition. Concrete was all cracked, but holding together. Culvert well filled with debris and drainage channel filled with vegetation.

Culvert #85 (Dive) 195' of 42" Cast Iron Pipe
Not Inspected

Exit

Headwall and wingwalls generally in good condition. A few efflorescent covered cracks.


206'9"
LONGITUDINAL SECTION
Scale 1" = 8'
42" C. I. Pipe
Original Surface
Notes
The bases of structures shown on this plan shall be considered as approximate only, and may be ordered by the Engineer to be at any elevation or of any dimensions necessary to give a proper foundation
Extra precaution should be taken to secure a proper foundation under head walls
2nd Class Paving to be laid on 6" of lining
Edges of 2nd Class paving to be protected by a course of paving stone at least 18" in depth.
Payment to be made therefor as 2nd. Class Paving
All exposed edges of concrete to be rounded to a radius of 1".
Length of concrete cutoff walls may be varied by the Engineer to correspond with excavation lines
PLAN
Scale 1" = 8'
Sheeting and bracing to be used in excavating through old north bank unless otherwise directed by the Engineer.
Edges of 3rd. Class Paving to be protected by a course of stone at least 12 inches deep. Payment therefor to be made as 3rd class stone paving
ELEVATION OF SOUTH END
Scale 1" = 4'
3rd class concrete
ELEVATION OF SOUTH CUT-OFF WALL
Scale 1" = 8'-0"
ELEVATION OF NORTH CUT-OFF WALL
Scale: 1" = 8'-0"
ELEVATION OF NORTH END
Scale 1" = 4'
2nd Class Concrete
3rd Class Concrete
SYMBOLS
DETAILS OF SCREEN
Scale 1" = 4'
Screen to be painted as per Bridge Specifications
Screen to be fastened to angle by 3/8" chain and approved lock.
Payment for lock and chain to be made at the contract price for structural steel.
Scale 3" = 1'
LAYOUT PLAN
Scale 1" = 50'
Ditch to be cleaned out as directed by the Engineer
SECTION C-C
BORINGS
Contract No. 62.
Erie Canal
Section 10
Between west line of Monroe County and Eagle Harbo
CULVERT AT STA. 4514 +19 12
OLD CULVERT NO. 84
Scales as indicated
MADE BY H.C. Kline
TRACED BY
1st CHECK BY
2nd CHECK BY
53

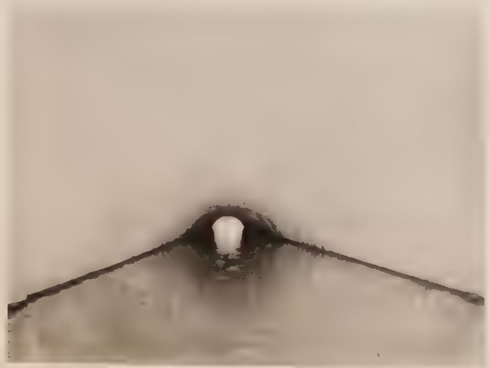

Core Wall
3rd Class Concrete
Natural
Surface
C I Pipe
Longitudinal Section
Scale 1"=8'
Edges of 3rd class paving to be protected by a course of stone at least 12 inches deep. Payment therefor to be made as 3rd class stone paving
PLAN
1"=4'
2nd Class Concrete
3rd Class Concrete
SYMBOLS
2nd Class Paving on 6" Lining
Elevation of Inlet
Scale 1"=4'
ELEVATION OF SOUTH CORE WALL
Scale 1"=8'
3rd class concrete
Section A-A
Scale 1"=4'
ELEVATION OF NORTH CORE WALL
Scale 1"=8'
Elevation of Outlet
Scale 1"=4'
Section through Screen
Scale 1"=2'
Section F-F
Scale 1"=2'
Details of Screen
Scale 1"=4"
LAYOUT
Contract No. 62.
Erie Canal
Section 10
Between west line of Monroe County and Eagle Harbor.
CULVERT AT STA. 4555+23.5 4554+60
OLD CULVERT NO. 85
Scales as indicated
54

Culvert #86 300.5' of 10.5' Wide X 7'9" High
Stone Block and
24' of Concrete Arch and
25'± of Concrete Box

Entrance
Headwall and left wingwall in good condition. Right wingwall scaled along top. This concrete box entrance was probably built soon after the Eagle Harbor Trough was repaired in 1927. It prevented debris from blocking the entrance (See Eagle Harbor Trough). Old headwall is at right.

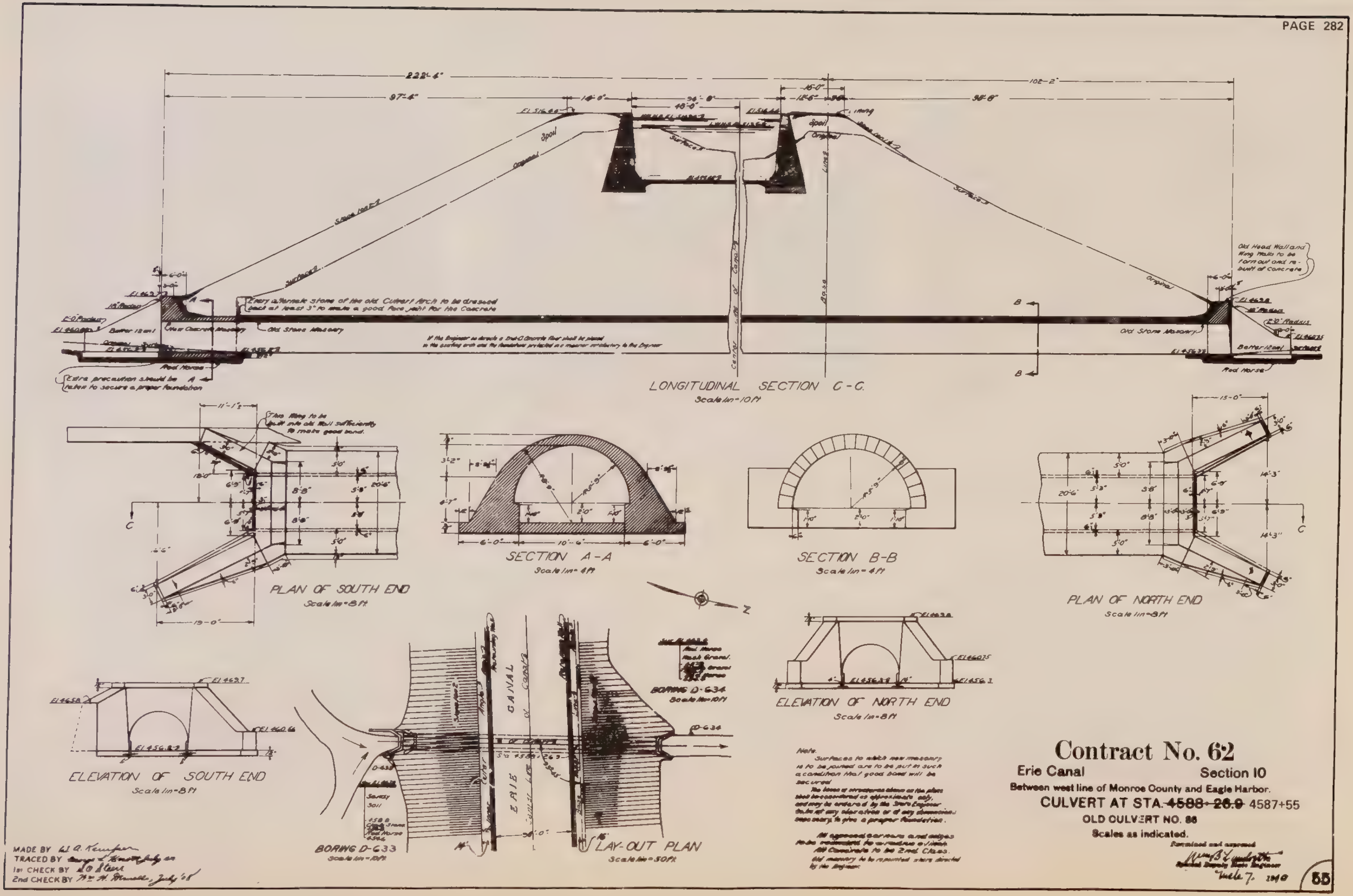
Looking South From Exit
Arch keystone next to concrete headwall has slipped down 2". Keystone has also slipped 2" at entrance. Cobwebs hang from ceiling by slipped block.

Exit
Headwall and wingwalls in fair to good condition with some efflorescent covered cracks. Horizontal crack about 1' above top of arch and vertical crack over top of arch.



Looking North From Entrance
Slipped keystone can just be seen about 20' into the arch section. Culvert inspected by raft.

From south to north (entrance to exit)-Concrete box in good condition. Concrete arch has a few efflorescent covered cracks, but they were dry. Stone block arch section has a few steady drips (mainly in center 1/3 of culvert) and walls were covered with stains and mineral deposits. Two blocks near the center of culvert appear to have lost 2" of their face. Many dry efflorescent covered cracks in short concrete arch headwall section. Keystones at both ends of the stone block arch have slipped down about 2". Overall, the culvert above the water line appeared in generally good condition.


LONGITUDINAL SECTION C-C.
Scale 1in=10 ft
PLAN OF SOUTH END
Scale 1in=8 ft
SECTION A-A
Scale 1in=4 ft
SECTION B-B
Scale 1in=4 ft
PLAN OF NORTH END
Scale 1in=8 ft
ELEVATION OF NORTH END
Scale 1in=8 ft
ELEVATION OF SOUTH END
Scale 1in=8 ft
BORING D-633
BORING D-634
LAY-OUT PLAN
Scale 1in=50 ft
ERIE CANAL
Contract No. 62
Erie Canal
Section 10
Between west line of Monroe County and Eagle Harbor.
CULVERT AT STA. 4588+26.9 4587+55
OLD CULVERT NO. 88
Scales as indicated.
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
88

Culvert #87 (Dive) 182' of 30" Cast Iron Pipe
Not Inspected

Exit

Headwall and wingwall ends next to headwall in good condition. Near ends of wingwalls scaled, fractured and delaminated. Culvert empties into swamp.

Culvert #88 (Dive) 221.5' of 48" Cast Iron Pipe
Not Inspected

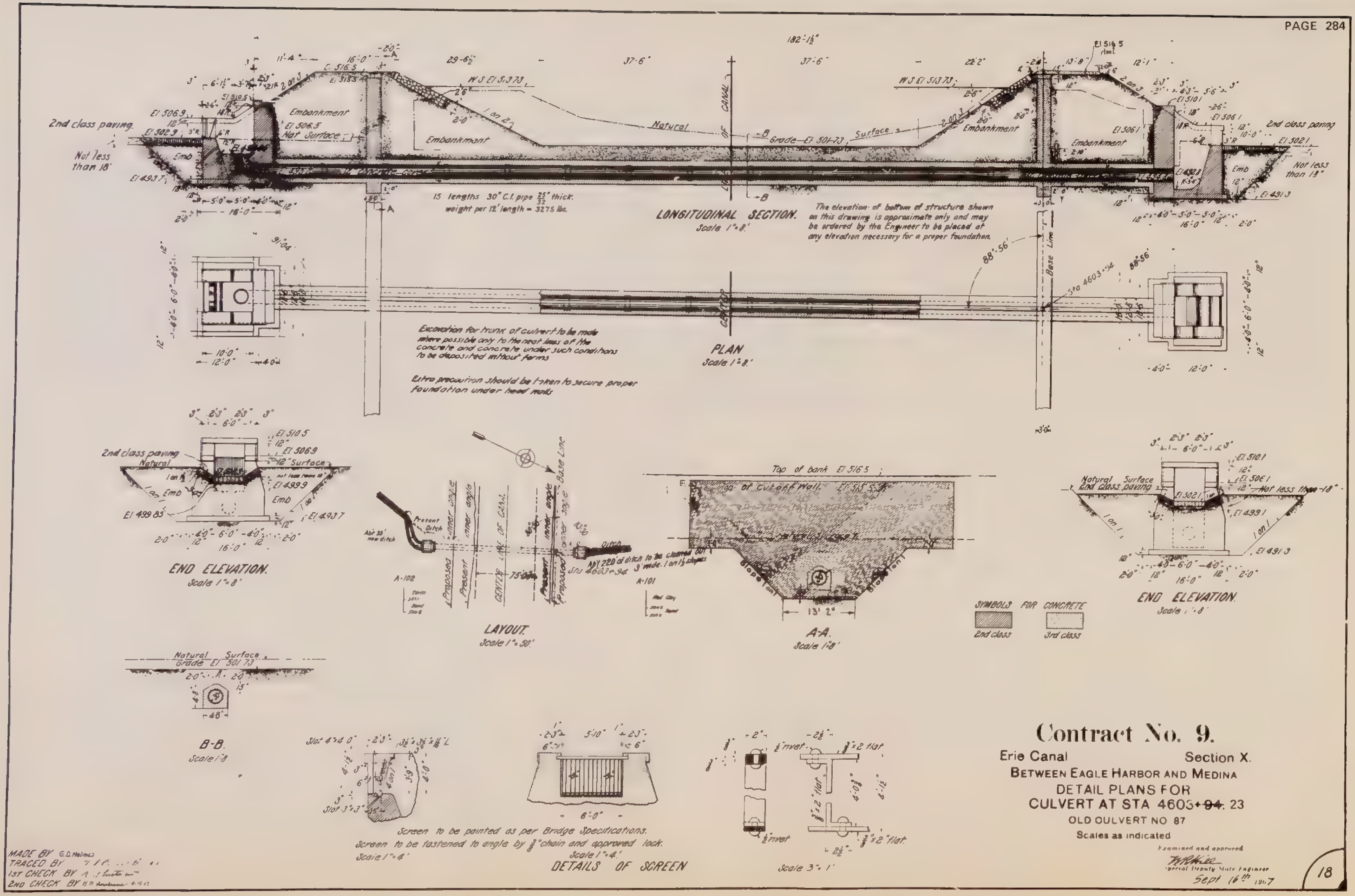
Exit

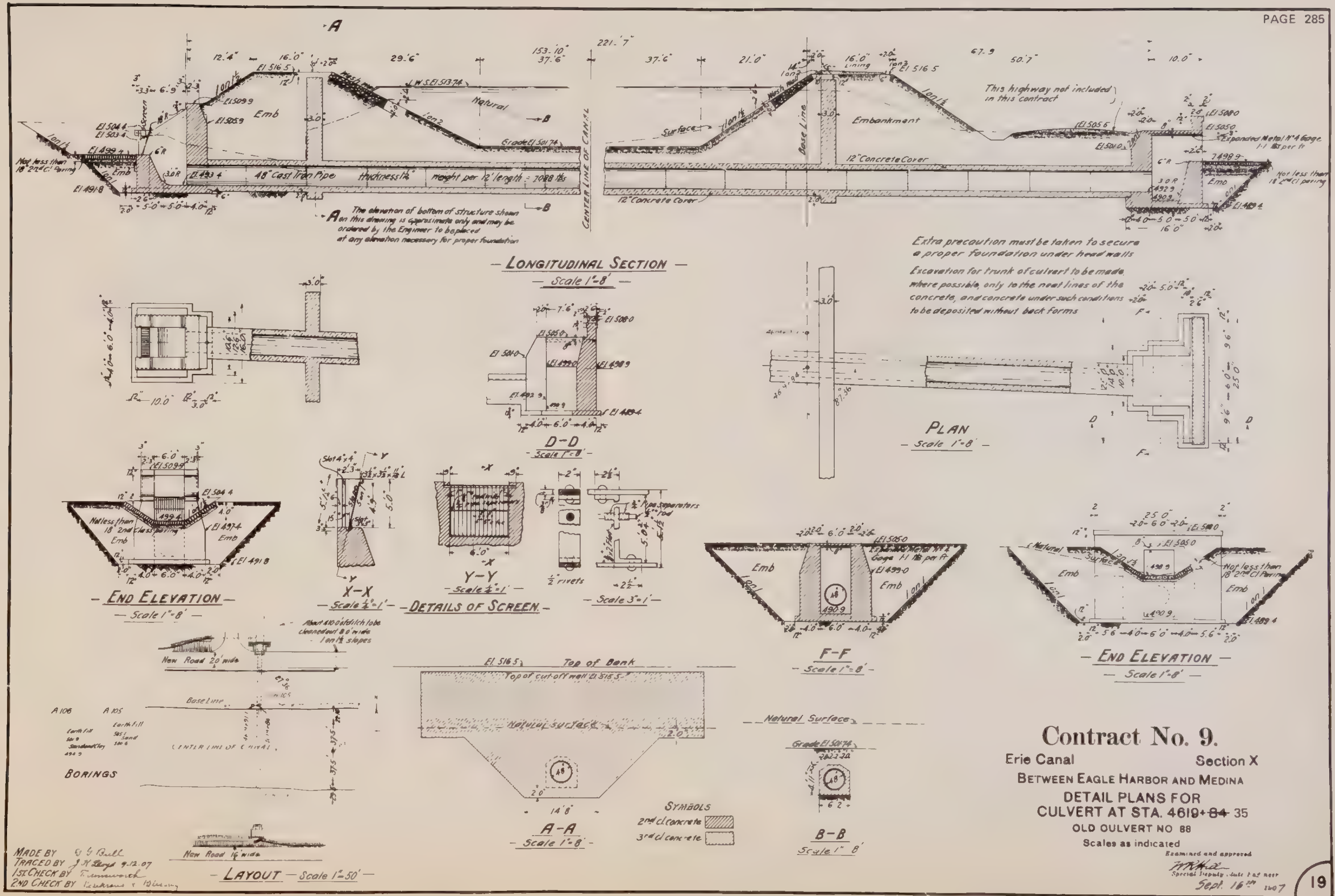
Headwall in fair condition due to many efflorescent covered cracks. 2 horizontal cracks, 1 at top and 1 at bottom of ceiling slab. Culvert well is just inside opening.

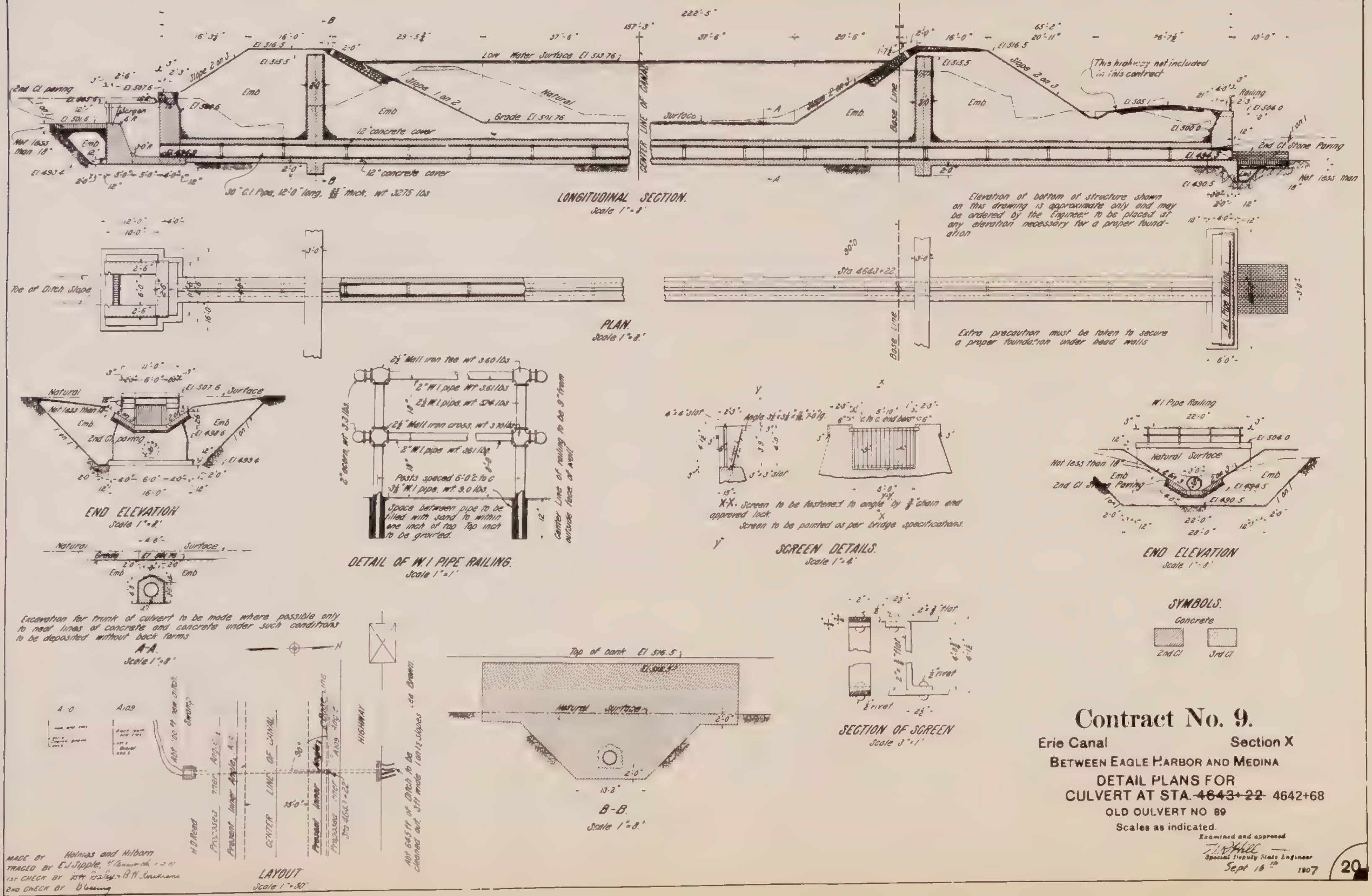
Culvert #89 222.5' of 30" Cast Iron Pipe
Not Inspected

Exit

Headwall in good condition. This is not a dive culvert. The drainage channel was filled with vegetation.


LONGITUDINAL SECTION.
Scale 1"=8'
15 lengths 30" C.I. pipe 25/32" thick. weight per 12' length = 3275 lbs.
The elevation of bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.
2nd class paving.
Not less than 18"
Not less than 18"
2nd class paving
Embankment
Natural
Surface
Grade El 501.73
PLAN
Scale 1"=8'
Excavation for trunk of culvert to be made where possible only to the neat lines of the concrete and concrete under such conditions to be deposited without forms
Extra precaution should be taken to secure proper foundation under head walls
END ELEVATION.
Scale 1"=8'
LAYOUT.
Scale 1"=50'
A-A.
Scale 1"=8'
Top of bank El 516.5
SYMBOLS FOR CONCRETE
2nd class
3rd class
END ELEVATION.
B-B.
Scale 1"=8'
Screen to be painted as per Bridge Specifications.
Screen to be fastened to angle by 3/8" chain and approved lock.
Scale 1"=4'
DETAILS OF SCREEN
Scale 3"=1'
MADE BY G.D. Holmes
TRACED BY
1ST CHECK BY
2ND CHECK BY
Contract No. 9.
Erie Canal
Section X.
BETWEEN EAGLE HARBOR AND MEDINA
DETAIL PLANS FOR
CULVERT AT STA 4603+94. 23
OLD CULVERT NO 87
Scales as indicated
Examined and approved
Special Deputy State Engineer
Sept 16th 1917
18


LONGITUDINAL SECTION
Scale 1"=8'
48" Cast Iron Pipe
12" Concrete Cover
CENTER LINE OF CANAL
Embankment
This highway not included in this contract
The elevation of bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for proper foundation
Extra precaution must be taken to secure a proper foundation under head walls
Excavation for trunk of culvert to be made, where possible, only to the neat lines of the concrete, and concrete under such conditions to be deposited without back forms
PLAN
Scale 1"=8'
D-D
Scale 1"=8'
END ELEVATION
Scale 1"=8'
X-X
Scale ½"=1'
DETAILS OF SCREEN
Y-Y
Scale ½"=1'
Scale 3"=1'
F-F
Scale 1"=8'
END ELEVATION
Scale 1"=8'
LAYOUT
Scale 1"=50'
BORINGS
A-A
Scale 1"=8'
B-B
Scale 1"=8'
SYMBOLS
2nd cl concrete
3rd cl concrete
Contract No. 9.
Erie Canal
Section X
BETWEEN EAGLE HARBOR AND MEDINA
DETAIL PLANS FOR
CULVERT AT STA. 4619+84 35
OLD CULVERT NO 88
Scales as indicated
Sept. 16th 1907
MADE BY
TRACED BY
1ST CHECK BY
2ND CHECK BY
19



Low Water Surface El 513.76
Slope 2 on 3
Slope 1 on 2
Natural
Grade El 511.76
12" concrete cover
Emb
CENTER LINE OF CANAL
Base Line
This highway not included in this contract
Railing
2nd Cl Stone Paving
2nd Cl paving
Screen
Not less than 18"
30" C.I. Pipe, 12'-0" long, 11/16" thick, wt 3275 lbs
LONGITUDINAL SECTION.
Scale 1" = 8'
Elevation of bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation
Toe of Ditch Slope
Sta 4643+22
PLAN.
Scale 1" = 8'
Extra precaution must be taken to secure a proper foundation under head walls
W.I. Pipe Railing
END ELEVATION
Scale 1" = 8'
2½" Mall iron tee wt 3.60 lbs
2" W.I. pipe wt 3.61 lbs
2½" W.I. pipe wt 5.74 lbs
2½" Mall iron cross wt 3.70 lbs
Posts spaced 6'-0" c. to c.
3½" W.I. pipe wt 9.0 lbs
Space between pipe to be filled with sand to within one inch of top. Top inch to be grouted.
Center Line of railing to be 9" from outside face of wall
DETAIL OF W.I. PIPE RAILING.
Scale 1" = 1'
X-X. Screen to be fastened to angle by ⅜" chain and approved lock.
Screen to be painted as per bridge specifications.
SCREEN DETAILS.
Scale 1" = 4'
Natural Surface
Not less than 18"
2nd Cl Stone Paving
END ELEVATION
Scale 1" = 8'
Excavation for trunk of culvert to be made where possible only to neat lines of concrete and concrete under such conditions to be deposited without back forms
A-A.
Scale 1" = 8'
Top of bank El 516.5
Natural Surface
B-B.
Scale 1" = 8'
SECTION OF SCREEN
Scale 3" = 1'
SYMBOLS.
Concrete
2nd Cl
3rd Cl
HIGHWAY
CENTER LINE OF CANAL
Present Inner Angle
Proposed Inner Angle
LAYOUT
Scale 1" = 50'
MADE BY Holmes and Hilborn
TRACED BY E.J. Sipple
1ST CHECK BY
2ND CHECK BY
Contract No. 9.
Erie Canal
Section X
BETWEEN EAGLE HARBOR AND MEDINA
DETAIL PLANS FOR
CULVERT AT STA. ~~4643+22~~ 4642+68
OLD CULVERT NO 89
Scales as indicated.
Examined and approved
Special Deputy State Engineer
Sept 16th 1907
20

Culvert #90 217.5' of 48" Cast Iron Pipe
Not Inspected

Exit

Headwall in good condition except for 1 large vertical crack in the center over the pipe. Culvert was half full of water. A stalagtite curtain wall extended to the water line at the 1st joint. Little or no water flow. 1 active 2" syphon.

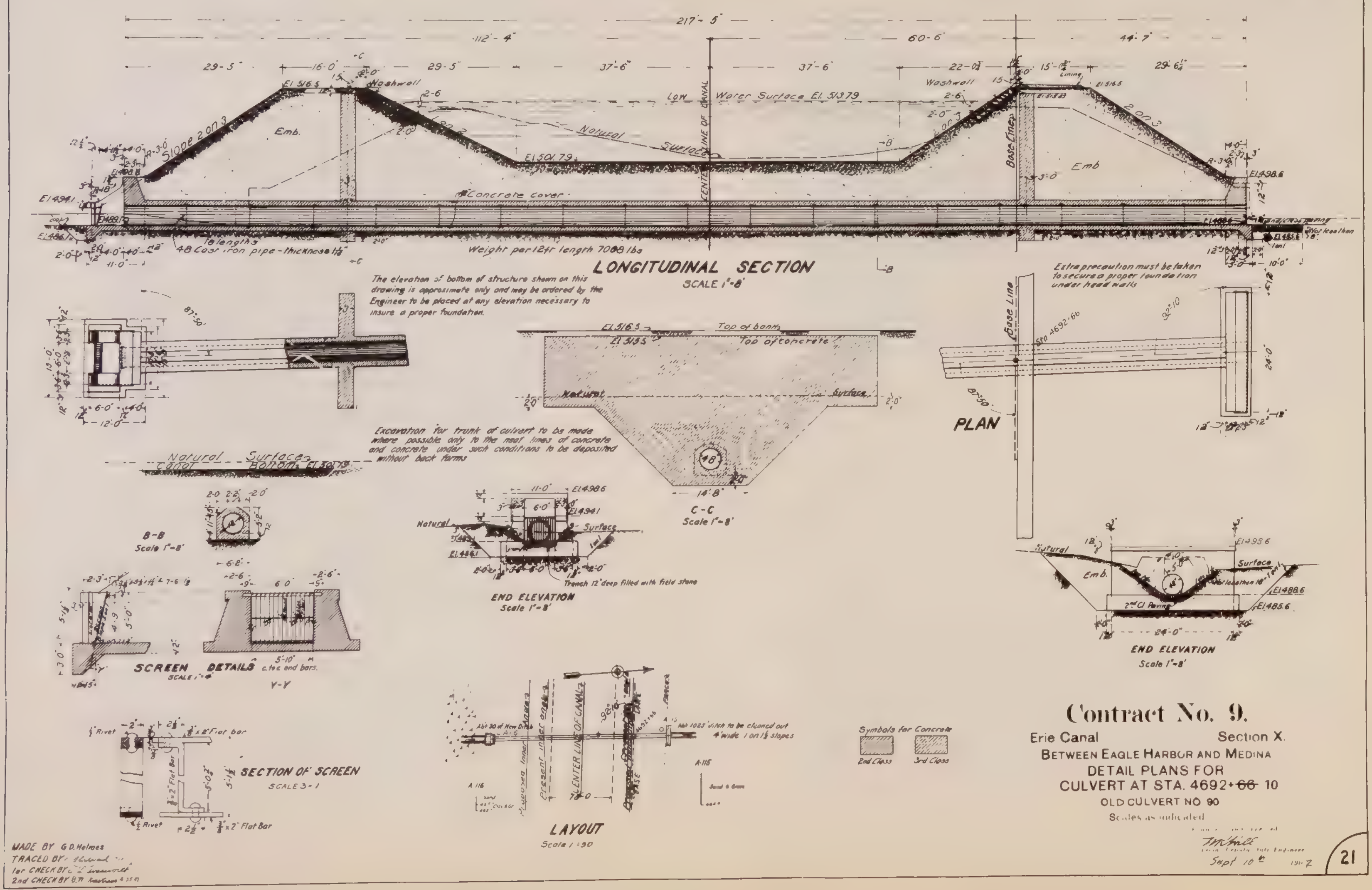
Knowlesville Widewater Area - Looking South

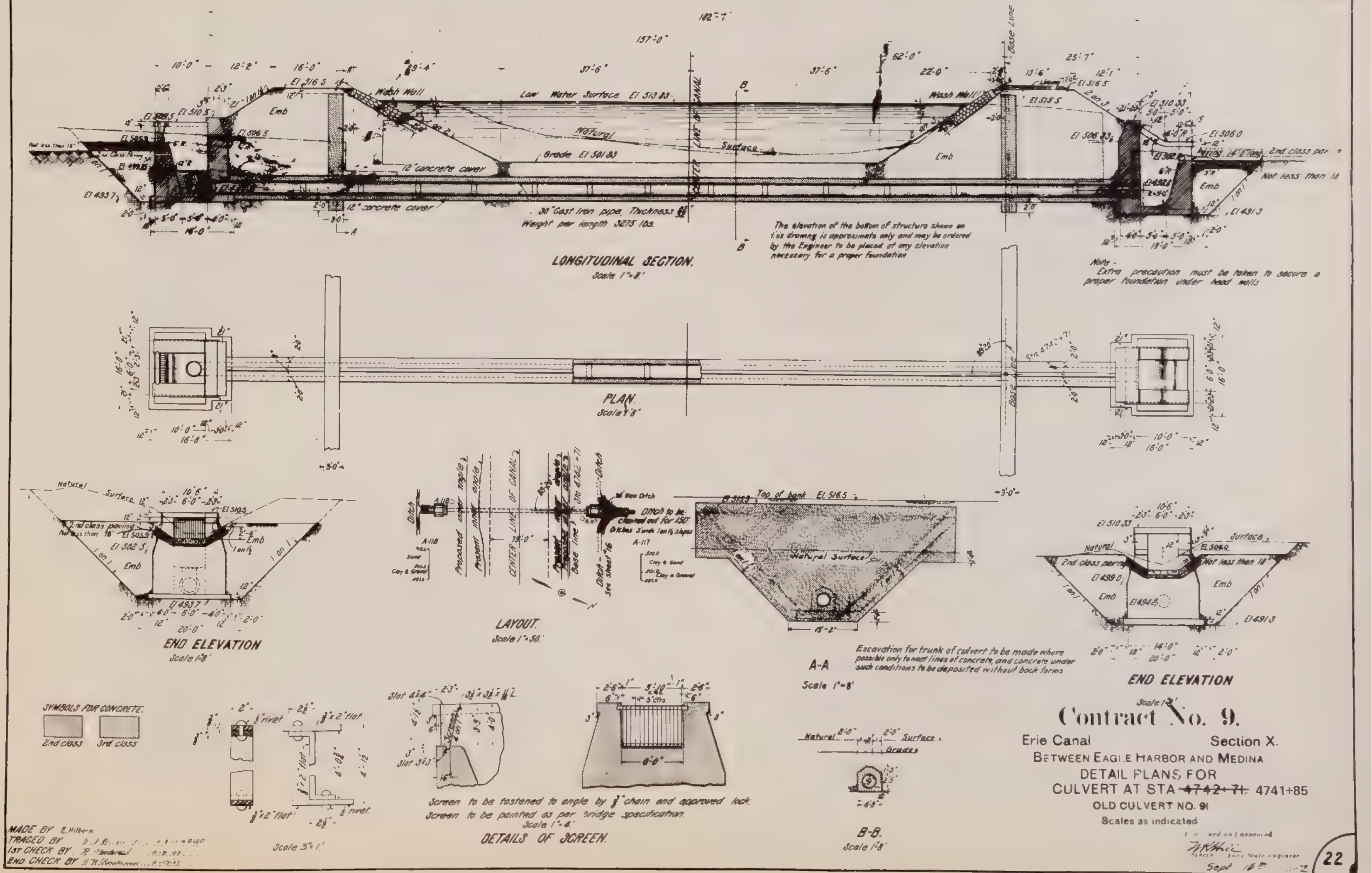
Culvert #90 was plugged prior to flooding the widewater. Old entrance exists under water at left. See Introduction - Canal Culverts

Culvert #91 (Dive) 182.5' of 30" Cast Iron Pipe
Not Inspected

Exit

Upper portion of headwall in good condition. Lower portion near water line had a 6' long, 1' wide by 8" deep horizontal scaled area. Wingwalls in poor condition with many cracks and deep scaling at the water line. Culvert well had been fenced off with railing, possibly to keep cows out.


LONGITUDINAL SECTION
SCALE 1"=8'
Low Water Surface El. 513.79
CENTER LINE OF CANAL
Natural Surface
Concrete cover
Washwall
Emb.
Slope 2 on 3
Base Line
48 Cast iron pipe-thickness 1½"
18 lengths
Weight per 12 ft length 7088 lbs
The elevation of bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary to insure a proper foundation.
Extra precaution must be taken to secure a proper foundation under head walls
Excavation for trunk of culvert to be made where possible only to the neat lines of concrete and concrete under such conditions to be deposited without back forms
Top of bank
Top of concrete
C-C
Scale 1"=8'
PLAN
B-B
Scale 1"=8'
END ELEVATION
Scale 1"=8'
Trench 12" deep filled with field stone
SCREEN DETAILS
Y-Y
SECTION OF SCREEN
SCALE 3=1
LAYOUT
Scale 1:90
Symbols for Concrete
2nd Class
3rd Class
Contract No. 9.
Erie Canal
Section X.
BETWEEN EAGLE HARBOR AND MEDINA
DETAIL PLANS FOR
CULVERT AT STA. 4692+66 10
OLD CULVERT NO 90
Scales as indicated
Sept 10 1907
MADE BY G.D. Holmes
TRACED BY
1st CHECK BY
2nd CHECK BY
21



Contract No. 9.

Erie Canal Section X.

BETWEEN EAGLE HARBOR AND MEDINA

DETAIL PLANS FOR

CULVERT AT STA ~~4742+71~~ 4741+85

OLD CULVERT NO. 91

Scales as indicated

Culvert #92 525'± of Various Pipe Sections

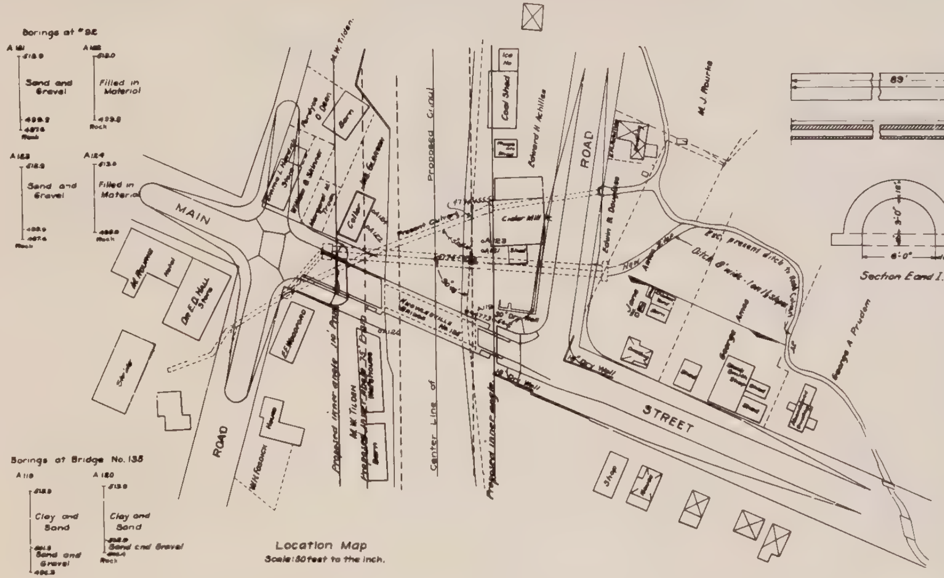
96' of 7.5' Wide x 3'7" High Concrete Arch
191' of Twin 42" Cast Iron Pipe
58' of 6' Wide x 4' High Concrete Arch
150'± of 4' Wide x 3.5' High Concrete Box
30'± of 4' Wide x 3.5'± High Planked over Stone Walls

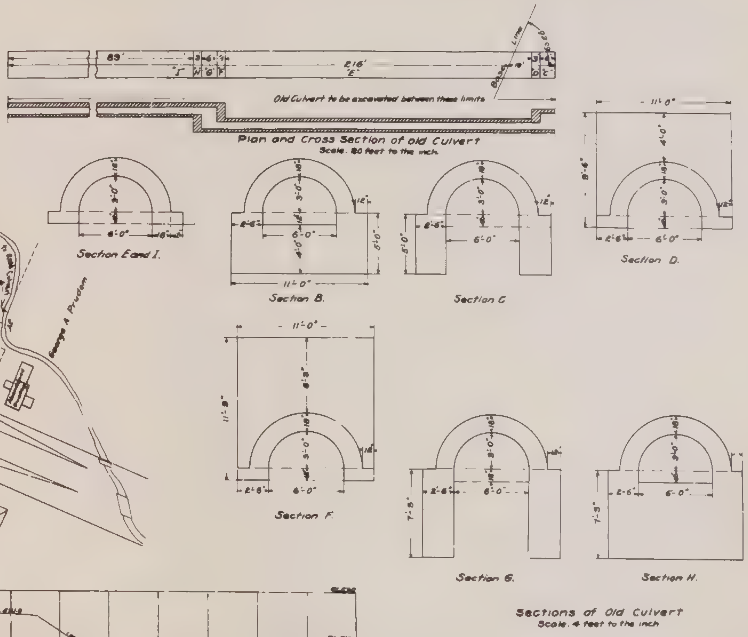
Entrance
Sewer creek flows under barn and out through right side of stone wall barn foundation. Someone erected stone walls along the creek, put planks over the top and created a lawn overhead.

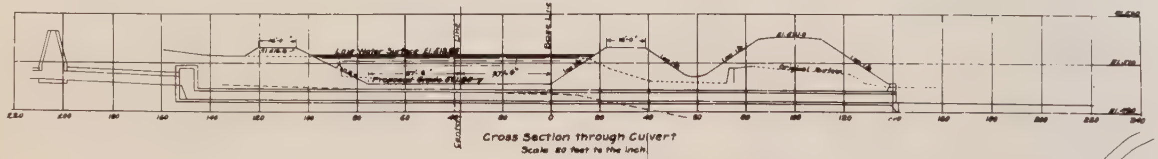
Knowlesville-Looking Southeast
Canal lift bridge is at left. Culvert entrance is under barn in background. A manhole entrance should exist by the side of the firehouse on the left according to the original plans, but it was not seen at this time.

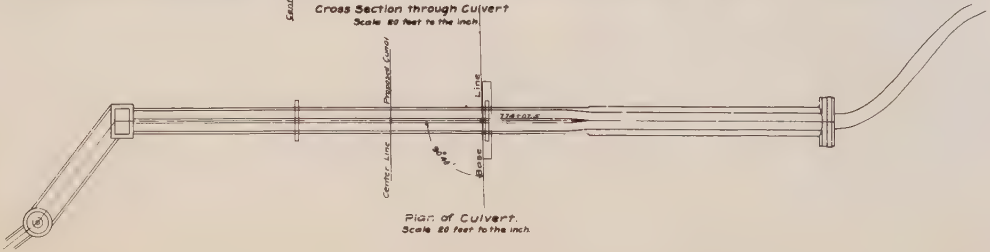
Exit
Headwall in fair condition. 2 vertical cracks over top of pipe and scattered other cracks. Pipe 2/3rds full of water. Drainage channel filled with debris.

Culvert Exit Area
Headwall is located just beyond road









Contract No. 9.

Erie Canal Section X

BETWEEN EAGLE HARBOR AND MEDINA

LOCATION MAP FOR NEW CULVERT & DETAILS OF OLD CULVERT

AT STA. ~~4774+07.5~~ 4773+18

OLD CULVERT NO. 92

Scales as indicated.

Examined and approved

Special Deputy ...

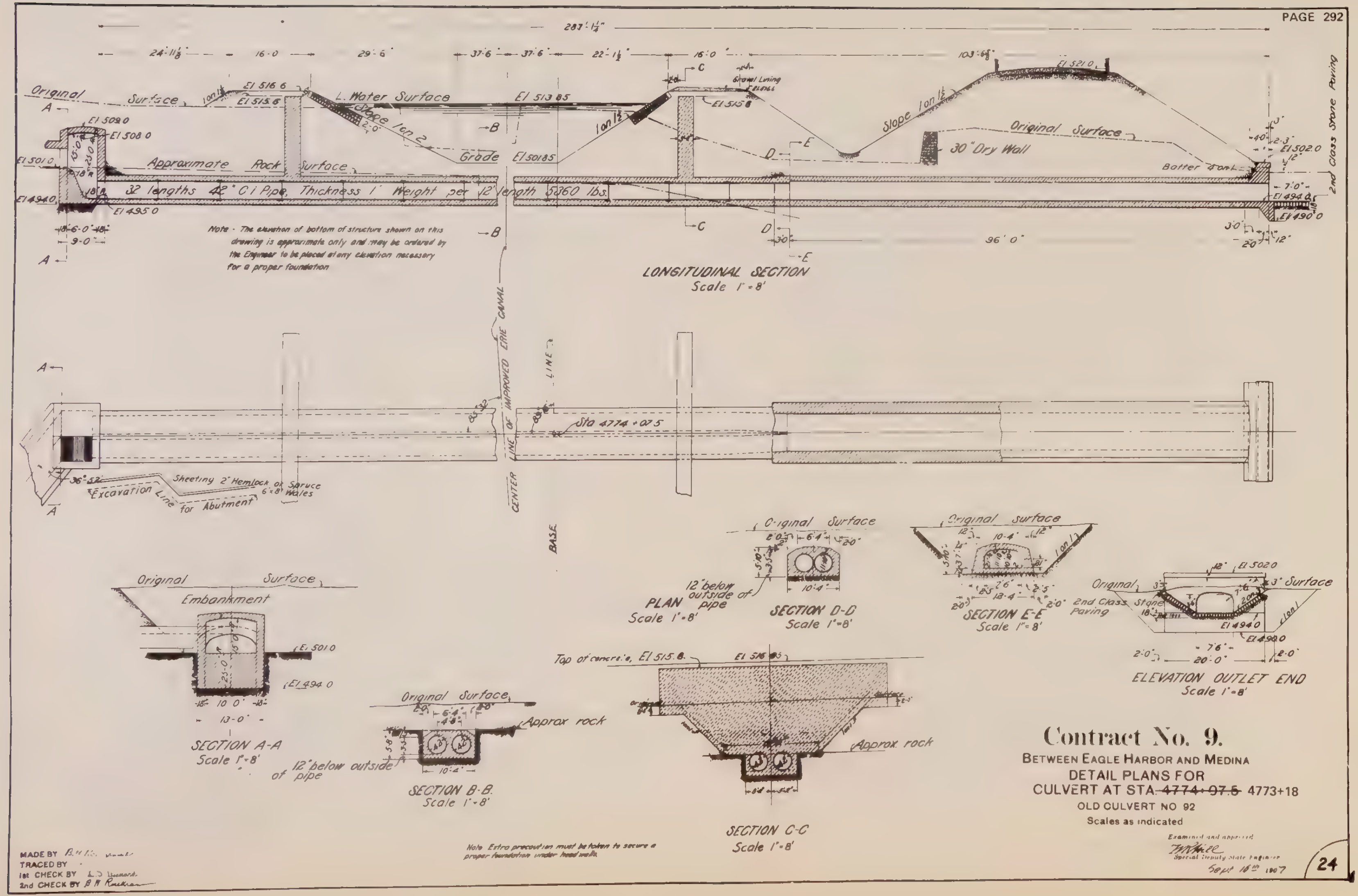
Sept. 6th 1907

MADE BY H G McKelvey

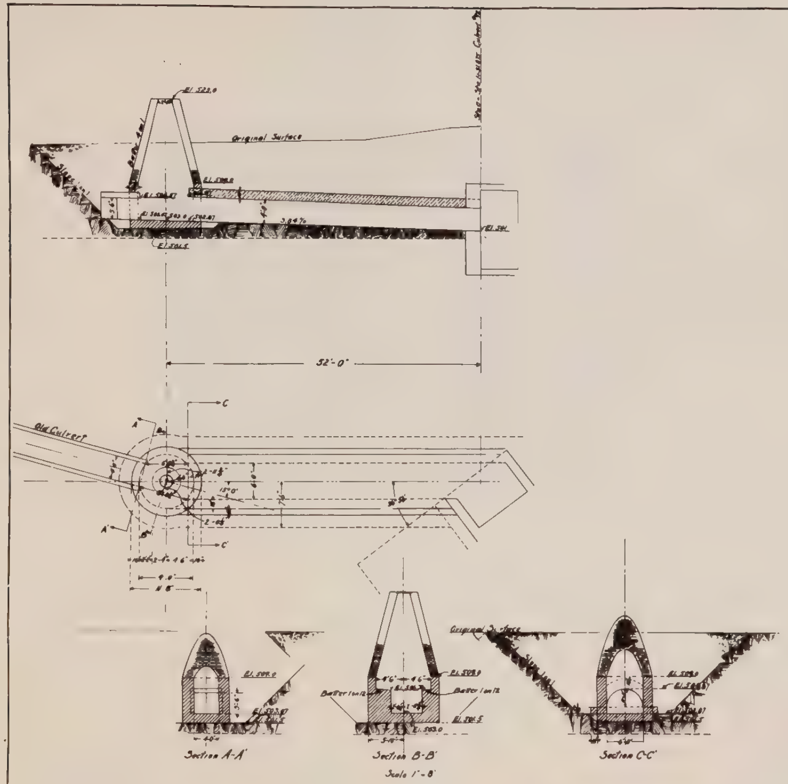
TRACED B

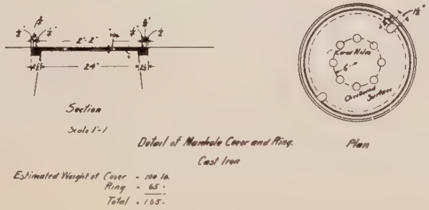
1st CHECK BY W A Leffler

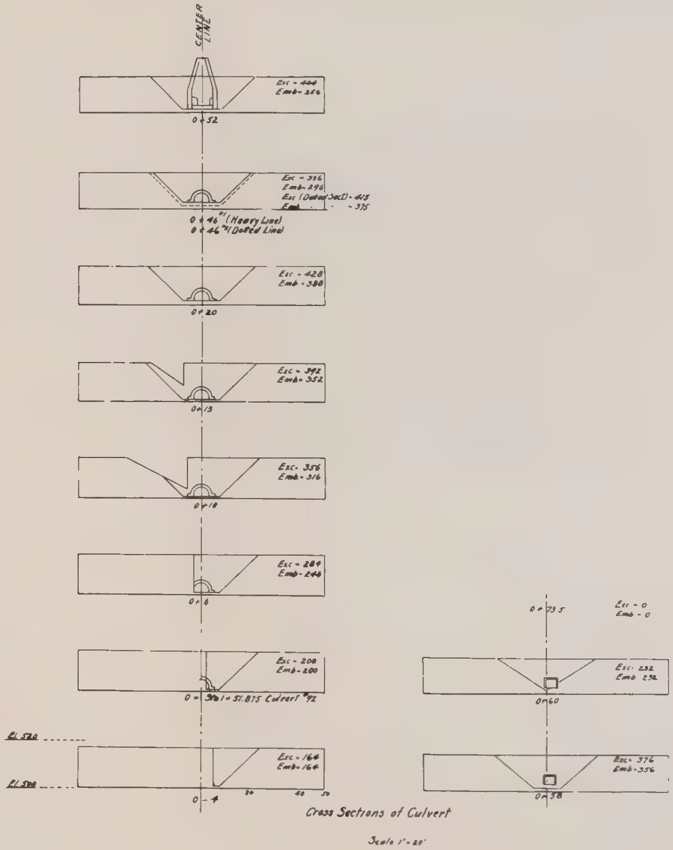
2nd CHECK BY



Original Surface
El 516.6
El 515.6
L. Water Surface
El 513.85
Slope 1 on 2
Grade El 501.85
Approximate Rock Surface
32 lengths 42" C.I. Pipe, Thickness 1" Weight per 12' length 5360 lbs.
El 509.0
El 508.0
El 501.0
El 494.0
El 495.0
El 515.6
Slope 1 on 1½
El 521.0
30" Dry Wall
Batter 4 on 1
El 502.0
El 494.0
El 490.0
2nd Class Stone Paving
Note - The elevation of bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation
LONGITUDINAL SECTION
Scale 1" = 8'
CENTER LINE OF IMPROVED ERIE CANAL
BASE LINE
Sta 4774 + 07.5
Sheeting 2" Hemlock or Spruce
6 x 8" Wales
Excavation Line for Abutment
PLAN
Scale 1" = 8'
12" below outside of pipe
SECTION D-D
Scale 1" = 8'
SECTION E-E
Scale 1" = 8'
2nd Class Stone Paving
ELEVATION OUTLET END
Scale 1" = 8'
Embankment
SECTION A-A
Scale 1" = 8'
Approx rock
SECTION B-B.
Scale 1" = 8'
Top of concrete, El 515.8
Approx. rock
SECTION C-C
Scale 1" = 8'
Note Extra precaution must be taken to secure a proper foundation under head walls.
Contract No. 9.
Between Eagle Harbor and Medina
DETAIL PLANS FOR
CULVERT AT STA. 4774+07.5 4773+18
OLD CULVERT NO 92
Scales as indicated
Examined and approved
Special Deputy State Engineer
Sept 16th 1907
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
24







Contract No. 9

Erie Canal — Section X

BETWEEN EAGLE HARBOR AND MEDINA

DETAIL PLAN CONNECTING OLD & NEW PORTIONS OF CULVERT NO. 92

AT STA. ~~4774+07.5~~ 4773+18

Scales as indicated

MADE BY ....
TRACED BY ....
1st. CHECK BY ....
2nd. CHECK BY ....

Examined and approved

Special Deputy State Engineer

Sept 16th 1907

Culvert #93 (Dive) 182' of 36" Cast Iron Pipe

Not Inspected

Exit

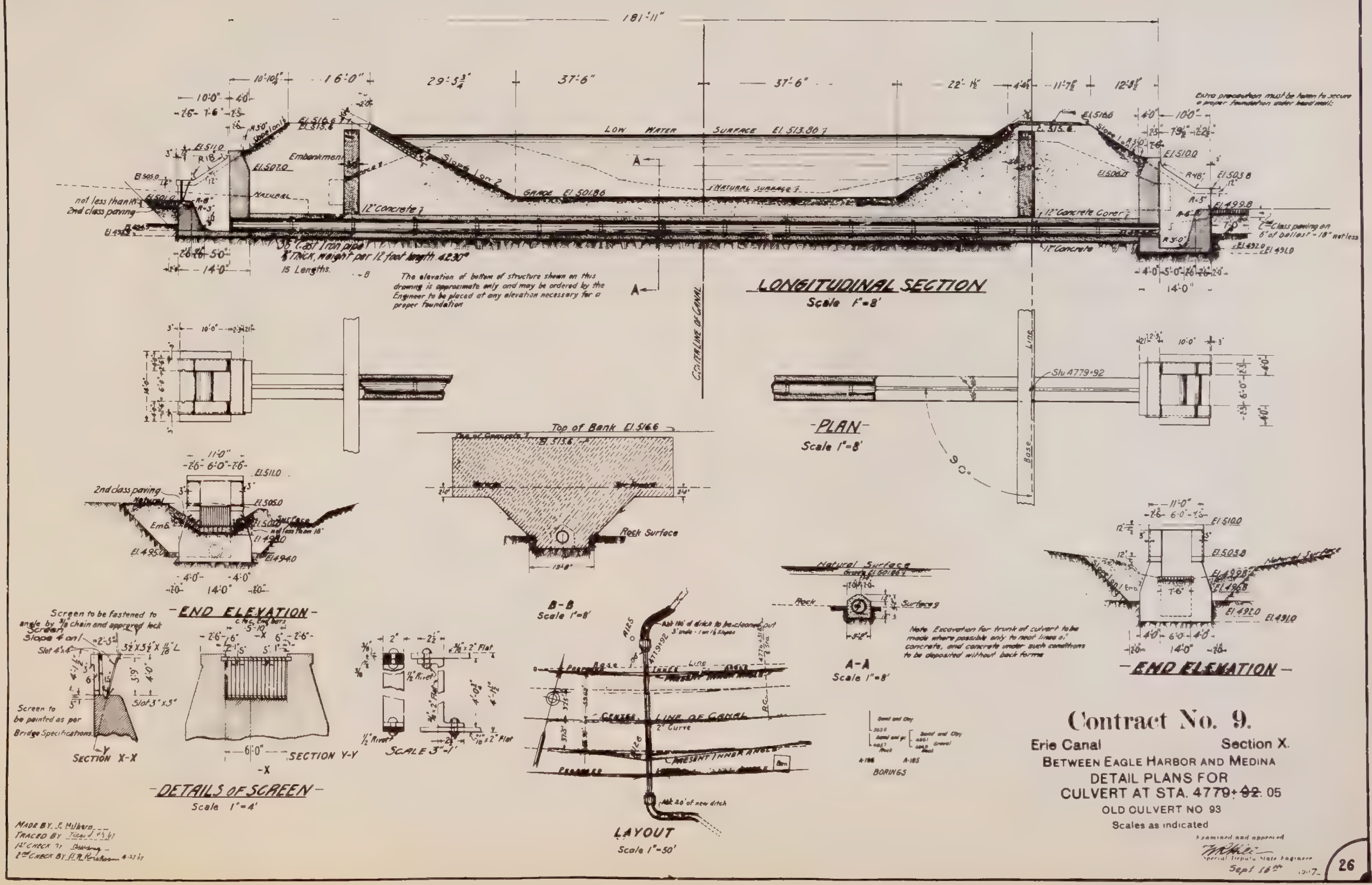
Headwall generally in good condition. A few cracks were just above the water line. Wingwalls had a number of cracks and low ends were a little undermined.

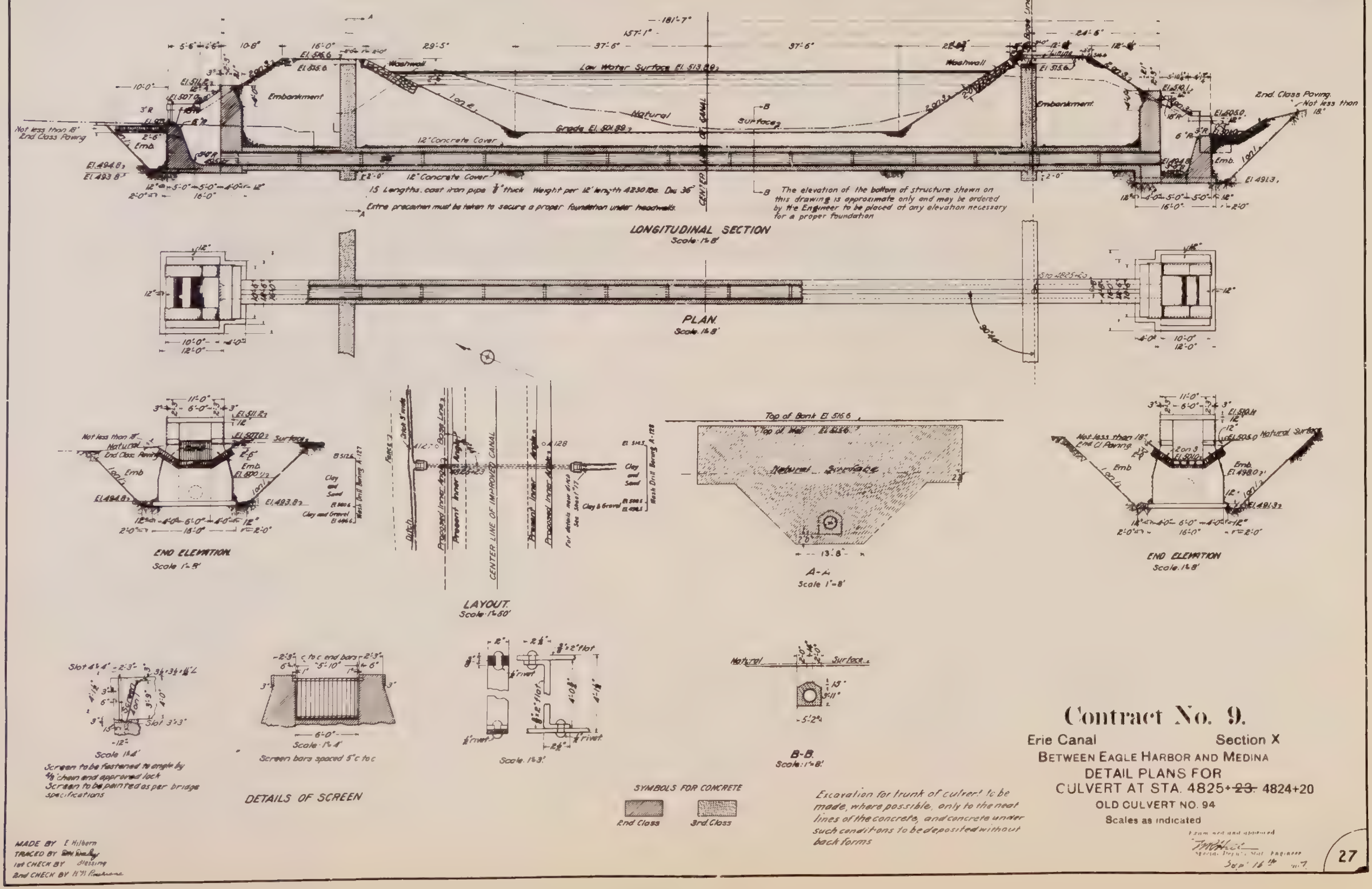
Culvert #94 (Dive) 181.5' of 36" Cast Iron Pipe

Not Inspected

Exit

Headwall in fair condition due to many efflorescent covered cracks. Wingwalls were in poor condition with many cracks. About 1/3 of left wingwall has disappeared.


181'-11"
LOW WATER SURFACE El. 513.86
Embankment
GRADE El. 501.86
NATURAL SURFACE
12" Concrete
12" Concrete Core
12" Concrete
not less than 18" 2nd class paving
36" Cast Iron pipe 1" THICK, weight per 12 foot length 4230#
15 Lengths.
The elevation of bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation
Extra precaution must be taken to secure a proper foundation under head wall.
2nd Class paving on 6" of ballast - 18" not less
LONGITUDINAL SECTION
Scale 1"=8'
CENTER LINE OF CANAL
Sta. 4779+92
Base Line
-PLAN-
Scale 1"=8'
Top of Bank El. 516.6
Rock Surface
B-B
Scale 1"=8'
Natural Surface
A-A
Scale 1"=8'
Note. Excavation for trunk of culvert to be made where possible only to neat lines of concrete, and concrete under such conditions to be deposited without back forms
-END ELEVATION-
Screen to be fastened to angle by 3/8 chain and approved lock
Screen to be painted as per Bridge Specifications
SECTION X-X
SECTION Y-Y
SCALE 3"=1'
-DETAILS OF SCREEN-
Scale 1"=4'
LAYOUT
Scale 1"=50'
BORINGS
-END ELEVATION-
Contract No. 9.
Erie Canal
Section X.
BETWEEN EAGLE HARBOR AND MEDINA
DETAIL PLANS FOR
CULVERT AT STA. 4779+92 05
OLD CULVERT NO 93
Scales as indicated
Examined and approved
Special Deputy State Engineer
26



LONGITUDINAL SECTION
Scale: 1"=8'
Low Water Surface El. 513.89
Washwall
Embankment
Natural Surface
Grade El. 501.89
12" Concrete Cover
15 Lengths cast iron pipe thick Weight per 12' length 4230 lbs. Dia. 36"
Extra precaution must be taken to secure a proper foundation under headwalls.
The elevation of the bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation
CENTER LINE OF CANAL
Not less than 18" 2nd Class Paving
2nd. Class Paving. Not less than 18"
PLAN.
Scale: 1"=8'
END ELEVATION
Scale 1"=8'
LAYOUT.
Scale 1"=50'
CENTER LINE OF IMPROVED CANAL
Wash Drill Boring A-127
Wash Drill Boring A-128
Clay and Sand
Clay & Gravel
Top of Bank El. 516.6
Top of Wall El. 515.6
Natural Surface
A-A
Scale 1"=8'
END ELEVATION
Scale 1"=8'
Scale 1"=4'
Screen to be fastened to angle by 5/16" chain and approved lock
Screen to be painted as per bridge specifications
Screen bars spaced 5" c to c
Scale 1"=4'
DETAILS OF SCREEN
Scale 1"=3'
B-B
Scale 1"=8'
SYMBOLS FOR CONCRETE
2nd Class
3rd Class
Excavation for trunk of culvert to be made, where possible, only to the neat lines of the concrete, and concrete under such conditions to be deposited without back forms
Contract No. 9.
Erie Canal
Section X
BETWEEN EAGLE HARBOR AND MEDINA
DETAIL PLANS FOR
CULVERT AT STA. 4825+23 4824+20
OLD CULVERT NO. 94
Scales as indicated
MADE BY E. Hilborn
TRACED BY
1st CHECK BY
2nd CHECK BY
27

Culvert #95 176' of Twin 10'2" Wide X 7' High
Concrete Lined Stone Block Arch and
30' of Concrete Arch

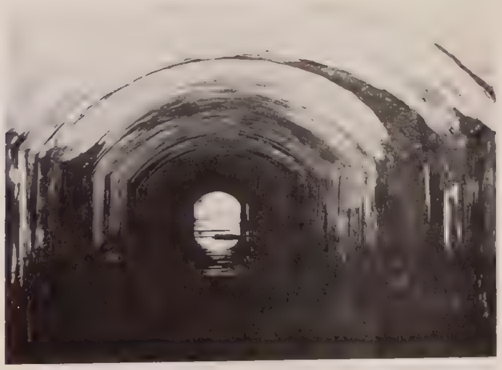
Entrance
Headwall and wingwalls were in fair to poor condition with numerous cracks, deep scaled and delaminated areas.

Exit
Headwall and wingwalls were in fair condition with many cracks, scaled and delaminated areas.
Culvert floor is bedrock.

West Barrel - Looking North from Entrance

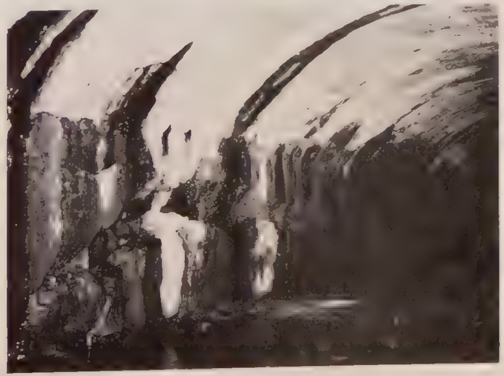
Both barrels contained similar deterioration - the concrete arches at the barrel ends had a number of efflorescent covered cracks. The concrete linings had many deep scale areas ranging in size up to 30 square feet. In 2 of these deep scale areas, the stone blocks behind the lining were exposed. Very little ceiling drainage, but one small stream was coming through the west side of the west barrel. Repairs are needed.

Culvert #95

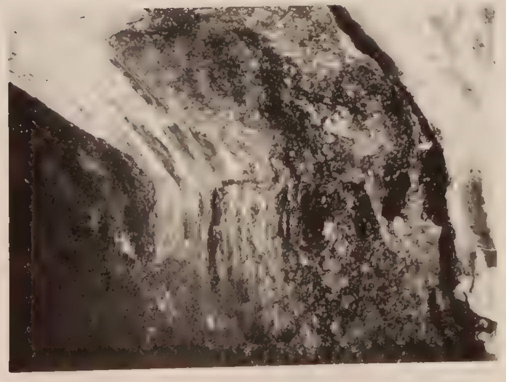


East Barrel - Looking South

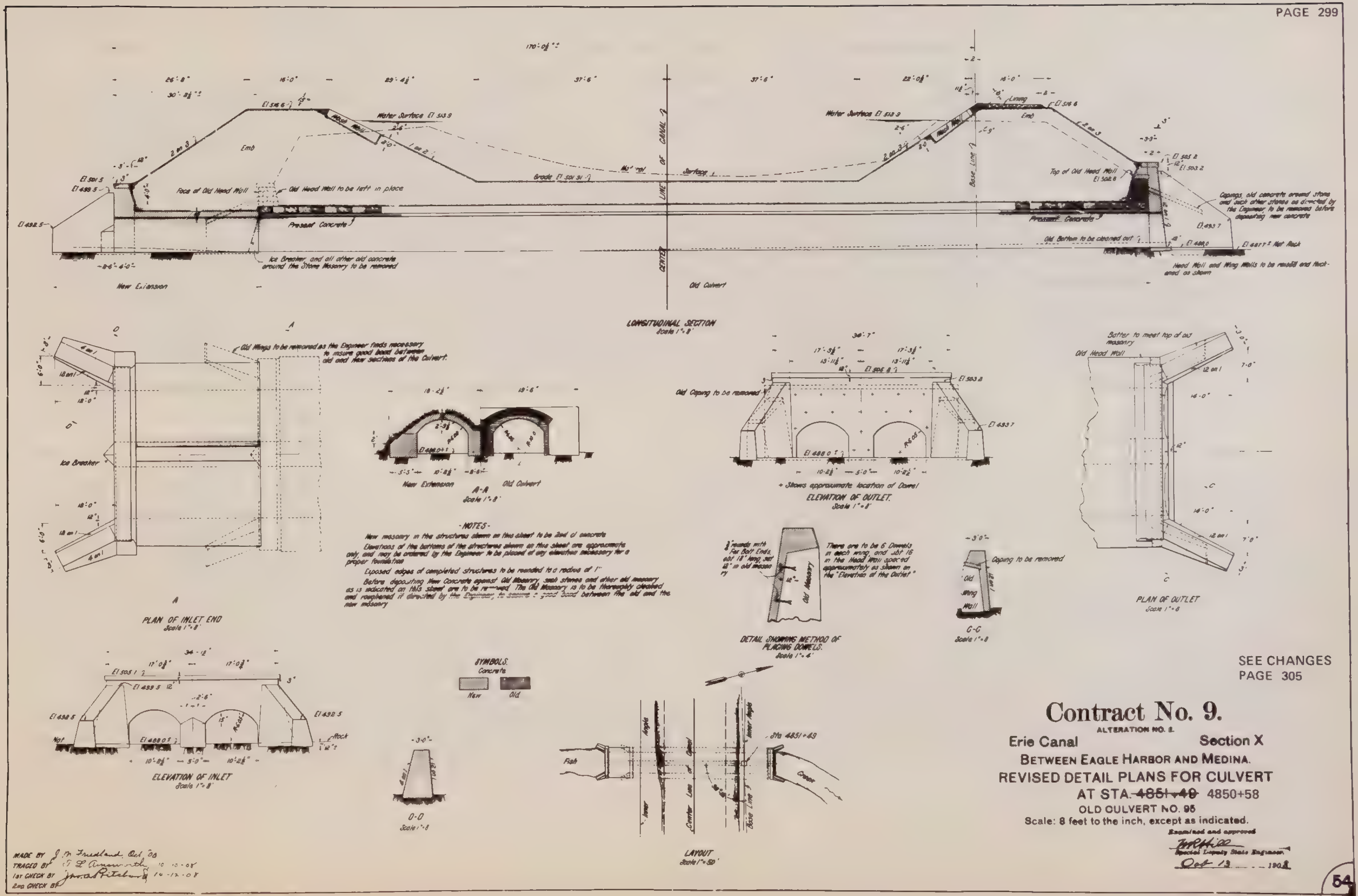
South End of East Barrel



West Barrel - Deep Scaled Areas
Stone blocks can be seen behind the 8" thick concrete lining. Small stream coming through block wall in this area.



West Barrel - Deep Scale Area



SEE CHANGES
PAGE 305

Contract No. 9.

ALTERATION NO. 2.

Erie Canal — Section X

BETWEEN EAGLE HARBOR AND MEDINA.

REVISED DETAIL PLANS FOR CULVERT AT STA. ~~4851+49~~ 4850+58

OLD CULVERT NO. 95

Scale: 8 feet to the inch, except as indicated.

Examined and approved

Special Deputy State Engineer

Oct 13 1908

Culvert #96 202' of 19' Wide X 11'± High Stone Block Arch

South End Headwall Aug. 1976
Dark area on lower left wingwall and west wall near south end began leaking seriously in Aug. 1976

North End Headwall

This culvert was first inspected on Oct. 1, 1975. At that time, a number of areas mainly in the south half of the culvert were slowly dripping. The whole inside had been covered with shotcrete and about 25% of the shotcrete was now either missing, loose or delaminated. Although the concrete roadway was cracked, uneven in places and covered by water in some areas, the culvert looked in good condition.

On Nov. 20, 1975, while passing through the culvert, a heavy leak was seen coming through the west wall near the south end and the Region was notified.

This culvert has had a problem with leakage since it was built. In the 1918 Superintendent of Public Works Report, the following information was found: "Knowlesville road culvert has been leaking for some time. Leakage becomes serious during the month of October. Steel sheet piling driven in berme bank east of culvert and 2 boatloads of clay placed on south bank in prism. This cut off leak temporarily. I am informed by the divison engineer that the canal prism is to be lined with concrete for a distance of 150', both east and west of culvert centerline."

Leak Through West Wall 30' from South End, Nov. 1975

Culvert 96
Prism Lining - Mar. 31, 1976
Lining placed in 1920 under Contract 200

Looking West - Prism Lining Over Culvert

Looking West - Prism Lining Over Culvert

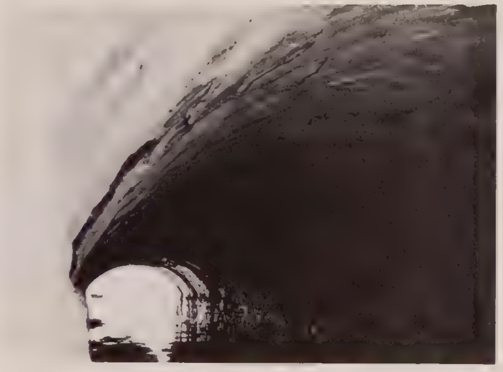
Looking East - Prism Lining over Culvert

Looking South Directly Over Culvert
3-4" of concrete missing over center of Culvert.
Note holes at top of south embankment.

Looking North Near Center of Culvert
Leaks are from nearly dry canal.

East Edge of Waterproofed Concrete Slab
Most of the 4" thick concrete top slab has disappeared here.

Culvert 96
Heavy Leaks Developed in August, 1976



Looking South From North End
Heavy leaks developed along base of west wall about 50-100' in from entrance and at west wingwall.
Note loose shotcrete lining.

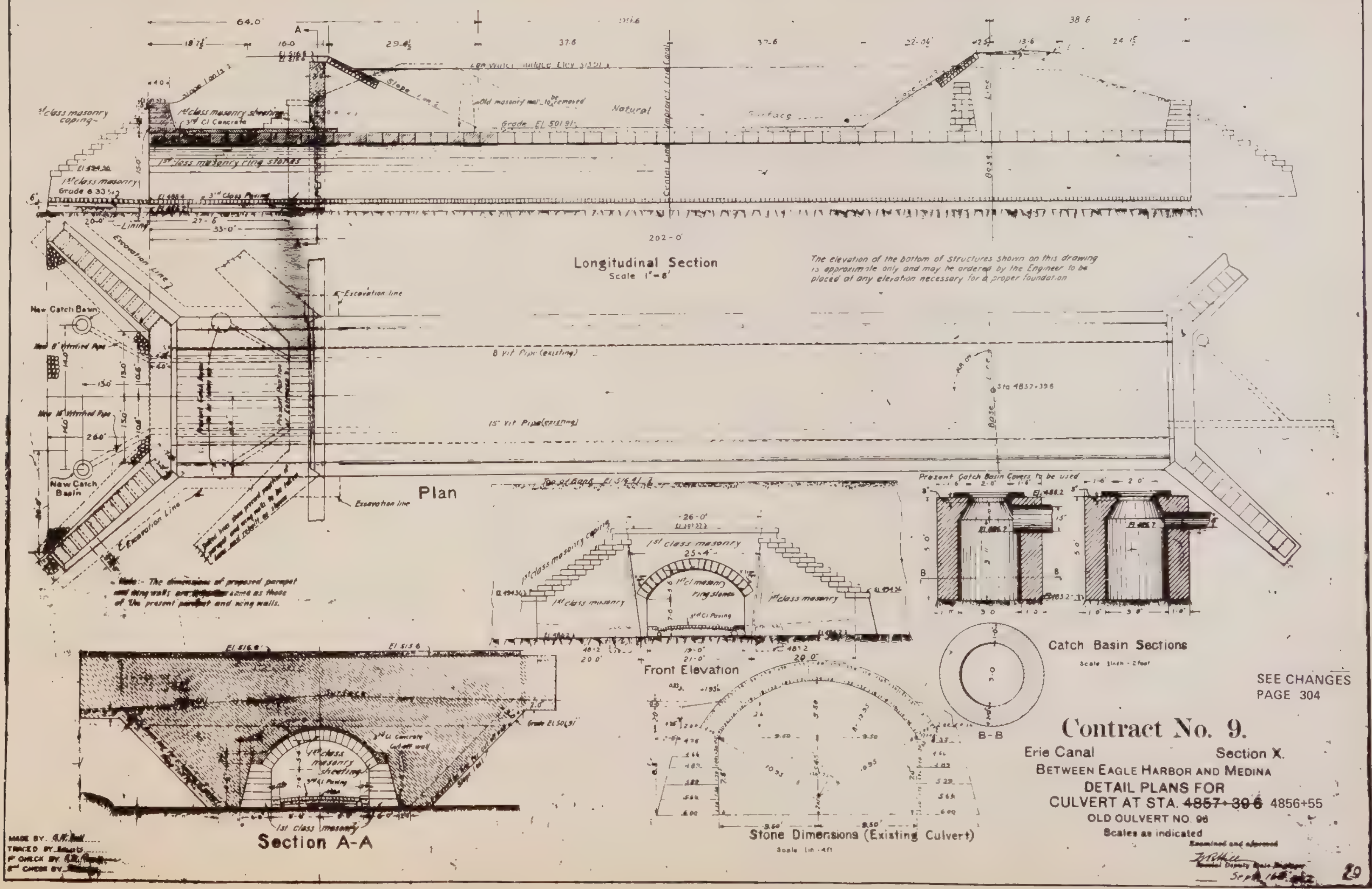
Looking West Along South Embankment From Culvert Centerline
In late Aug. 1976, the south embankment was lined with clay for approximately 75' on either side of the culvert in an attempt to stop leaks.

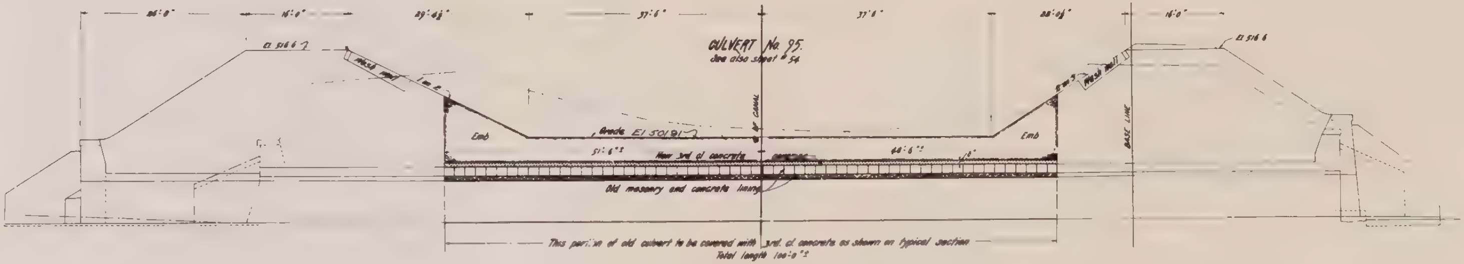
After the south embankment was lined with clay, 2 small whirlpools were seen near the water edge over the culvert. These were plugged by hand.

After the clay lining was placed, the rate of leakage had been cut by approximately 1/3. In the mean time, the decision was made to remove the old prism lining and replace it with a continuous waterproofing membrane. This work is to be done in the Spring of 1977 under Contract D95315.

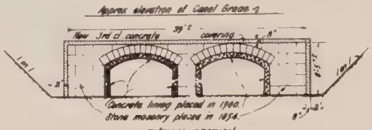
Looking East, March 1977 - Arrows Denote Holes
Most of the clay was on the canal bottom.

Leak Hole Found About 20' West of Fence
Clay only partially plugged hole.


Longitudinal Section
Scale 1" = 8'
The elevation of the bottom of structures shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation
202 - 0'
1st class masonry coping
1st class masonry sheeting
3rd Cl Concrete
Old masonry wall to be removed
Natural
Surface
Grade EL 501.91
1st class masonry ring stones
1st class masonry
3rd Class Paving
Excavation Line
Excavation line
New Catch Basin
New 8" Vitrified Pipe
New 15" Vitrified Pipe
8" Vit Pipe (existing)
15" Vit Pipe (existing)
Plan
Note:- The dimensions of proposed parapet and wing walls are the same as those of the present parapet and wing walls.
Front Elevation
1st class masonry
1st class masonry ring stones
3rd Cl Paving
Section A-A
3rd Cl Concrete Cut-off wall
1st class masonry sheeting
3rd Cl Paving
1st class masonry
Stone Dimensions (Existing Culvert)
Present Catch Basin Covers to be used
Catch Basin Sections
Scale 1inch = 2feet
B-B
SEE CHANGES
PAGE 304
Contract No. 9.
Erie Canal
Section X.
BETWEEN EAGLE HARBOR AND MEDINA
DETAIL PLANS FOR
CULVERT AT STA. 4857+39.6 4856+55
OLD CULVERT NO. 96
Scales as indicated
Examined and approved
Special Deputy State Engineer
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY

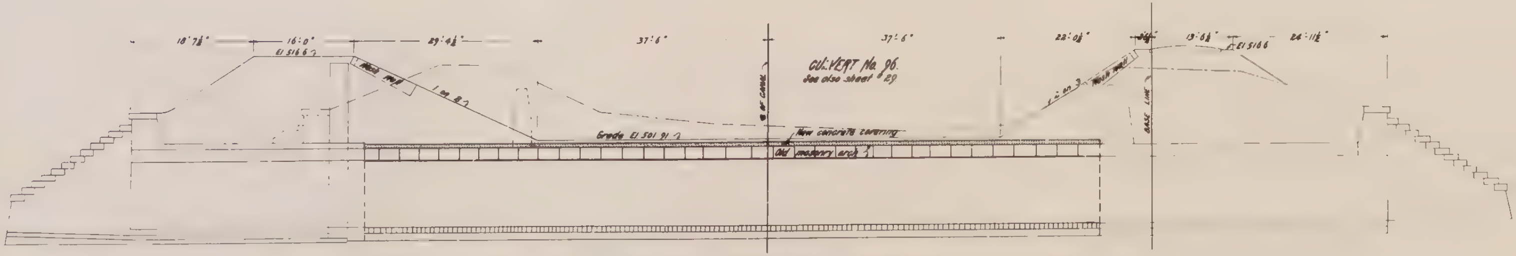


LONGITUDINAL SECTION.
Scale 1" = 8'

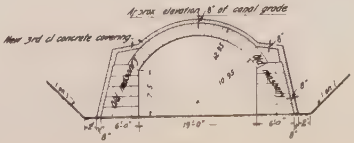


TYPICAL SECTION.
Scale 1" = 8'

Note -
The details of old masonry shown on this typical section were taken from tracing made from blue print #13-88 on file in Western Division Office



LONGITUDINAL SECTION.
Scale 1" = 8'



TYPICAL SECTION.
Scale 1" = 8'

NOTES

The concrete covering shall be placed over only such parts of the old masonry as the Engineer shall deem necessary for securing proper reinforcement and protection against leakage, and the excavation for same shall be made only to the depth necessary for placing of concrete, or for the proper inspection of the old work.

Before depositing new concrete against old masonry all loose fragments of stone and mortar shall be removed and the old masonry thoroughly cleaned and wetted to insure a good bond between the old and new work.

Where the excavation leaves the core walls exposed or in any danger of overturning or buckling, the walls shall be properly protected by timber bracing, the same to be paid for at the contract price for sheeting and bracing.

SEE CHANGES
PAGE 305

Contract No. 9.

ALTERATION NO. 8.

Erie Canal — Section X

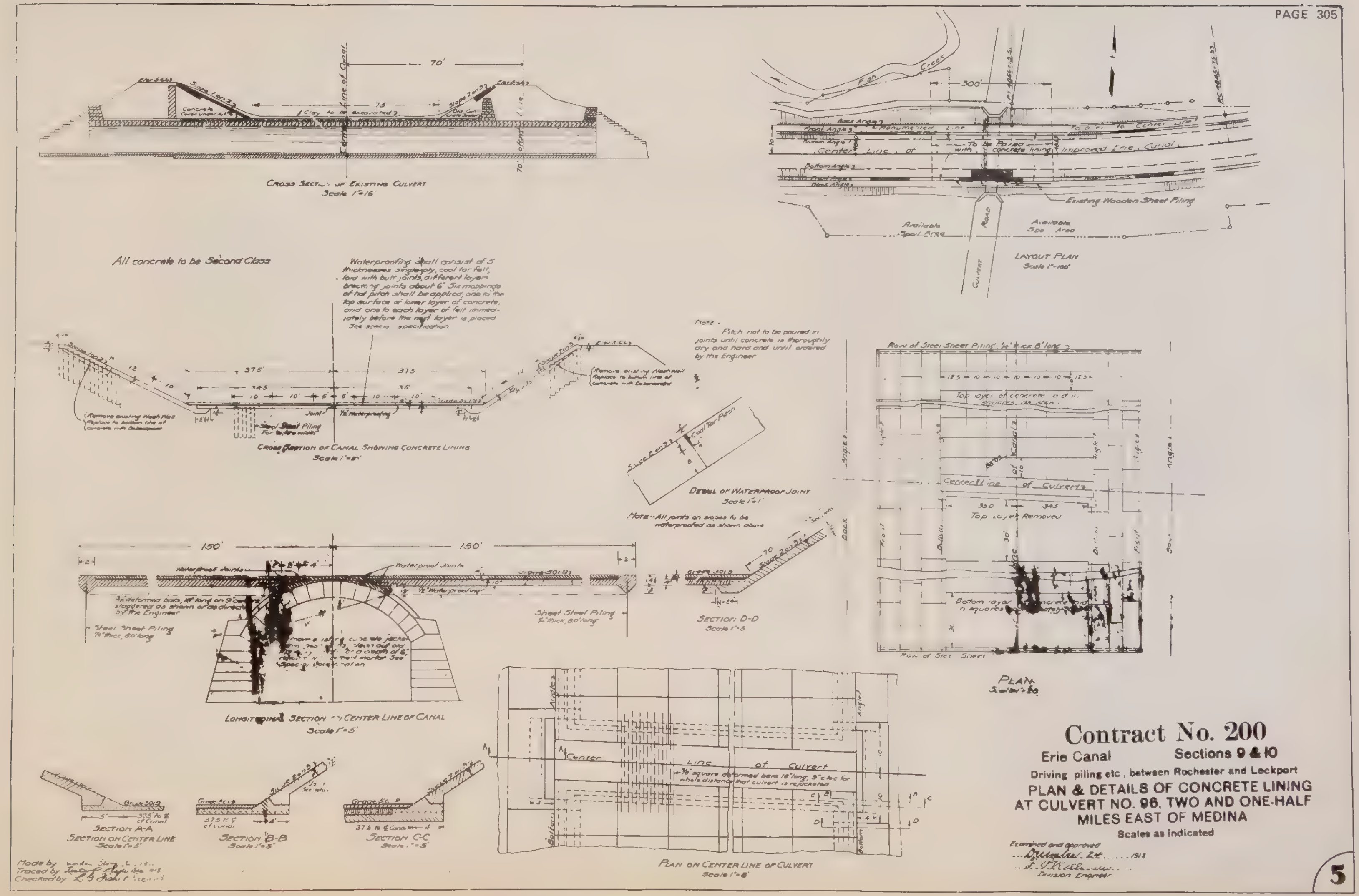
SECTIONS OF CULVERTS, STAS. ~~4851+40~~ 4850+58 & ~~4857+39.5~~ 4856+55, SHOWING CONCRETE COVERING TO BE LAID

OLD CULVERT NOS. 95 & 96

Scale: 8 feet to the inch

Examined and approved
Special Deputy State Engineer.
Dec 6 1909

MADE BY
TRACED BY
1ST CHECK BY W. C. Kline
2ND CHECK BY



70'
Cross Section of Existing Culvert
Scale 1"=16'
Fish Creek
300'
Front Angle
Bottom Angle
Back Angle
Center Line of Improved Erie Canal
To be Paved with concrete lining
Existing Wooden Sheet Piling
Available Spoil Area
Road
Culvert
Layout Plan
Scale 1"=100'
All concrete to be Second Class
Waterproofing shall consist of 5 thicknesses single-ply, coal tar felt, laid with butt joints, different layers breaking joints about 6". Six moppings of hot pitch shall be applied, one to the top surface of lower layer of concrete, and one to each layer of felt immediately before the next layer is placed
See special specification
Note - Pitch not to be poured in joints until concrete is thoroughly dry and hard and until ordered by the Engineer
Cross Section of Canal Showing Concrete Lining
Scale 1"=5'
Coal Tar Pitch
Detail of Waterproof Joint
Scale 1"=1'
Note - All joints on slopes to be waterproofed as shown above
Row of Steel Sheet Piling
Top layer of concrete
Center Line of Culvert
Top Layer Removed
Bottom layer
Plan
150'
150'
Waterproof Joints
Sheet Steel Piling
Steel Sheet Piling
Section D-D
Scale 1"=5'
Longitudinal Section on Center Line of Canal
Scale 1"=5'
Center Line of Culvert
Section A-A
Section on Center Line
Scale 1"=5'
Section B-B
Scale 1"=5'
Section C-C
Scale 1"=5'
Plan on Center Line of Culvert
Scale 1"=8'
Contract No. 200
Erie Canal
Sections 9 & 10
Driving piling etc, between Rochester and Lockport
PLAN & DETAILS OF CONCRETE LINING AT CULVERT NO. 96, TWO AND ONE-HALF MILES EAST OF MEDINA
Scales as indicated
Examined and approved
1918
Division Engineer
Made by
Traced by
Checked by
5

Culvert #97 (Dive) 181.5' of Twin 36" Cast Iron Pipe
Not Inspected

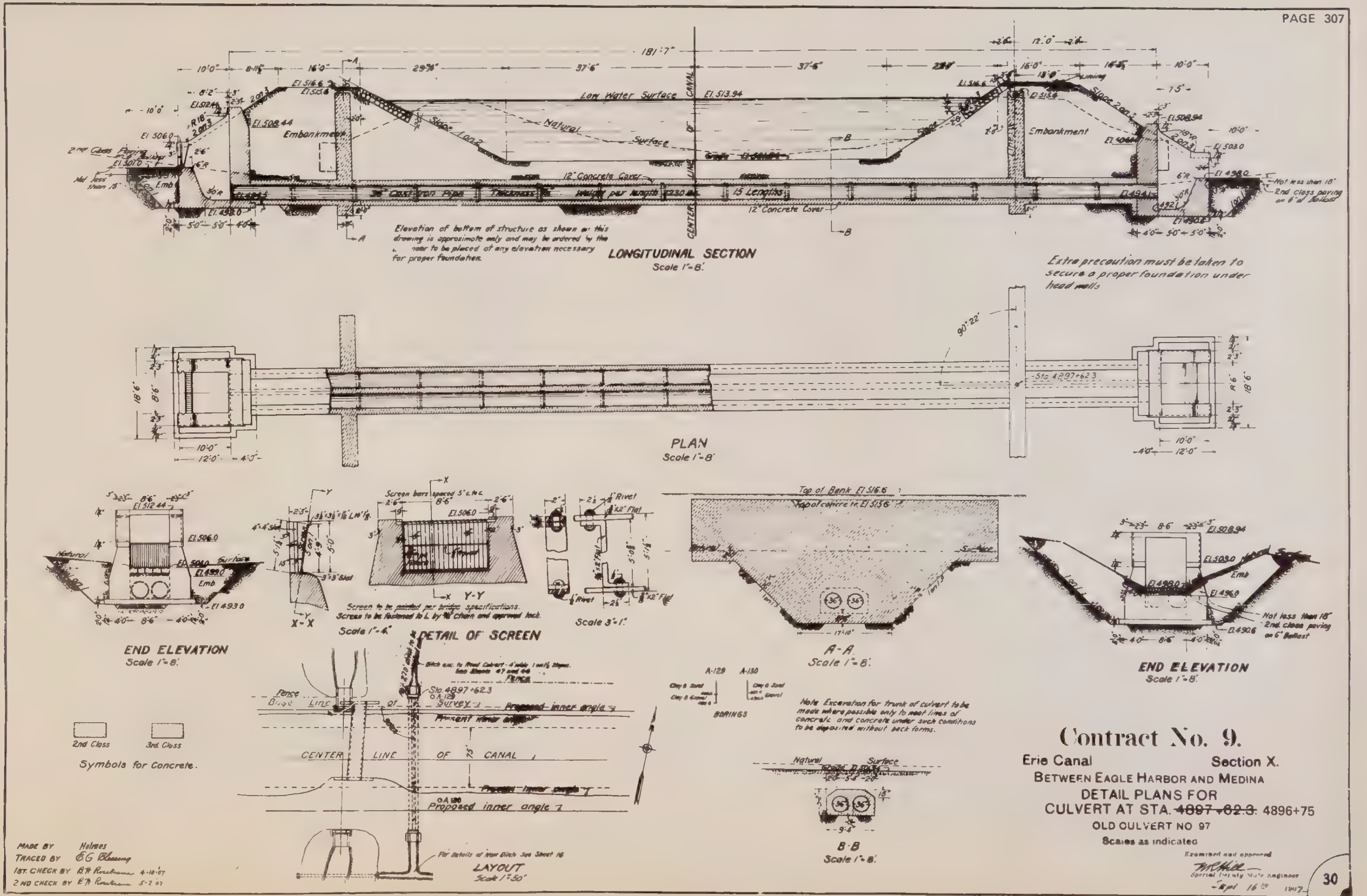
Exit

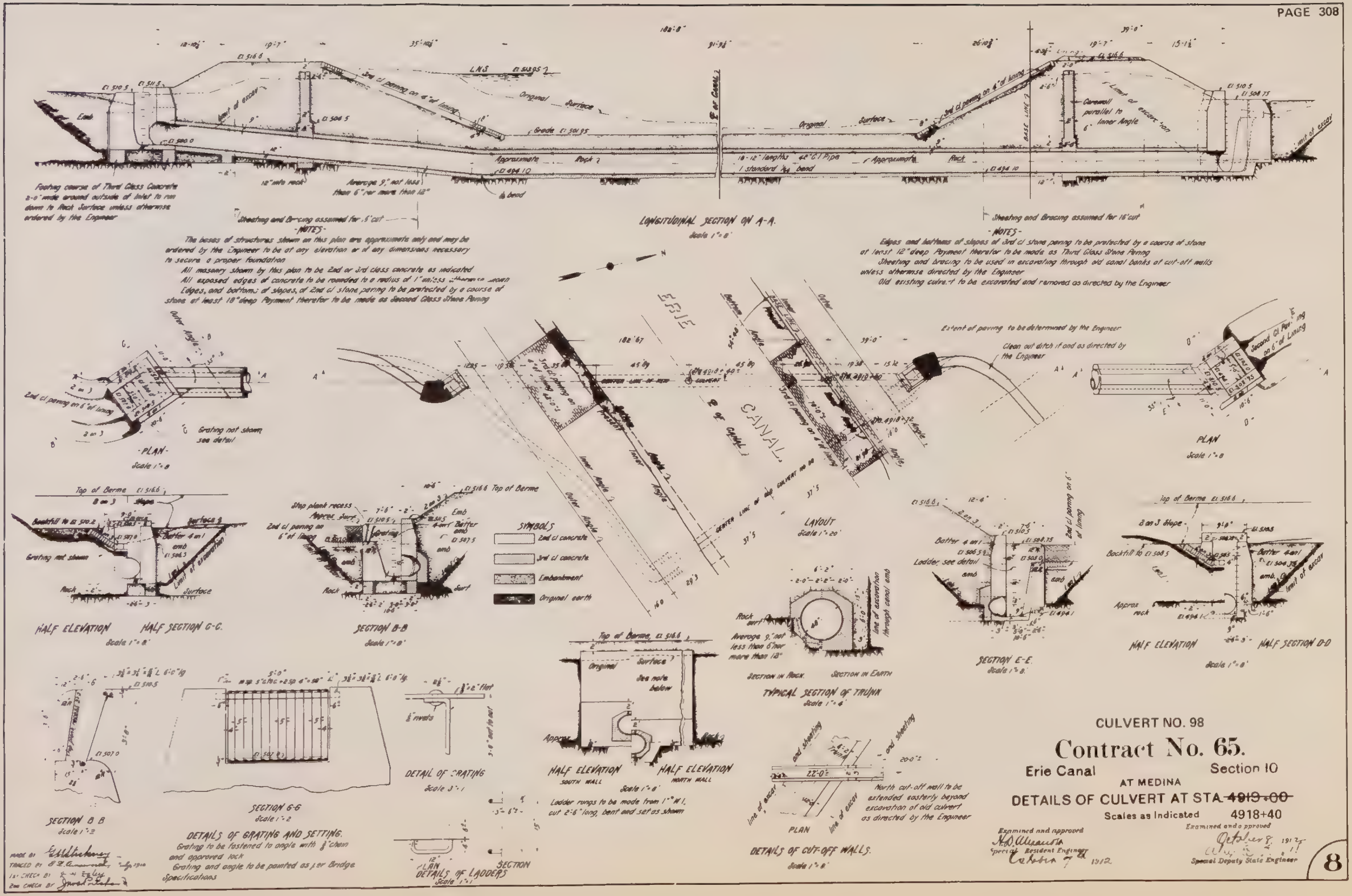
Headwall and most of wingwalls in good condition. Low ends of both wingwalls were undermined and appeared ready to fall off. 2-3" syphons, 1 active.

Culvert #98 (Dive) 221.5' of 48" Cast Iron Pipe
Not Inspected

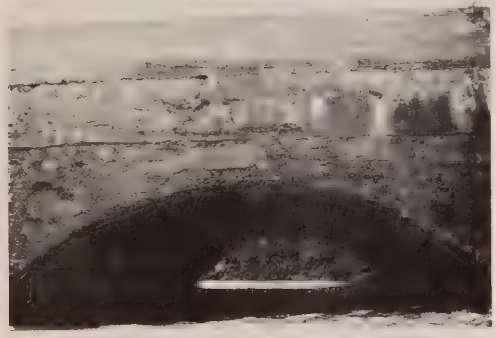
Exit

Headwall and wingwalls in fair to poor condition with many cracks, scaled and delaminated areas. Very deep culvert well.


LONGITUDINAL SECTION
Scale 1"=8'
Low Water Surface
El. 513.94
Natural Surface
Embankment
CENTER LINE OF CANAL
12" Concrete Cover
15 Lengths
Elevation of bottom of structure as shown on this drawing is approximate only and may be ordered by the ... to be placed at any elevation necessary for proper foundation.
Extra precaution must be taken to secure a proper foundation under head walls
PLAN
Scale 1"=8'
END ELEVATION
Scale 1"=8'
X-X
Y-Y
Scale 1"=4'
DETAIL OF SCREEN
Screen to be painted per bridge specifications.
Screen to be fastened to L by ⅜" Chain and approved lock.
Scale 3"=1'
Top of Bank El. 516.6
A-A
Scale 1"=8'
END ELEVATION
Scale 1"=8'
2nd Class
3rd Class
Symbols for Concrete.
LAYOUT
Scale 1"=50'
CENTER LINE OF CANAL
Proposed inner angle
BORINGS
Note Excavation for trunk of culvert to be made where possible only to neat lines of concrete and concrete under such conditions to be deposited without back forms.
B-B
Scale 1"=8'
Contract No. 9.
Erie Canal
Section X.
Between Eagle Harbor and Medina
DETAIL PLANS FOR
CULVERT AT STA. 4897+62.3 4896+75
OLD CULVERT NO 97
Scales as indicated
Examined and approved
Special Deputy State Engineer
Sept 16th 1907
30
MADE BY Holmes
TRACED BY E.G. Blessing
1ST. CHECK BY
2ND CHECK BY

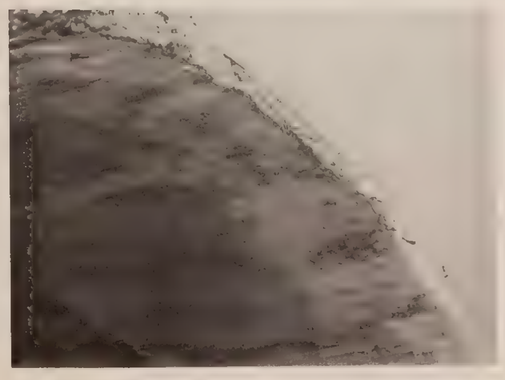


LONGITUDINAL SECTION ON A-A.
Scale 1" = 8'
Footing course of Third Class Concrete 2-0" wide around outside of inlet to run down to Rock Surface unless otherwise ordered by the Engineer
Sheeting and Bracing assumed for 16'cut
-NOTES-
The bases of structures shown on this plan are approximate only and may be ordered by the Engineer to be at any elevation or of any dimensions necessary to secure a proper foundation
All masonry shown by this plan to be 2nd or 3rd class concrete as indicated
Edges, and bottoms of slopes, of 2nd cl stone paving to be protected by a course of stone at least 18" deep Payment therefor to be made as Second Class Stone Paving
Edges and bottoms of slopes of 3rd cl stone paving to be protected by a course of stone at least 12" deep Payment therefor to be made as Third Class Stone Paving
Sheeting and bracing to be used in excavating through old canal banks at cut-off walls unless otherwise directed by the Engineer
Old existing culvert to be excavated and removed as directed by the Engineer
ERIE CANAL
Extent of paving to be determined by the Engineer
Clean out ditch if and as directed by the Engineer
PLAN
LAYOUT
Scale 1" = 20'
SYMBOLS
2nd cl concrete
3rd cl concrete
Embankment
Original earth
HALF ELEVATION
HALF SECTION C-C.
SECTION B-B
TYPICAL SECTION OF TRUNK
SECTION IN ROCK.
SECTION IN EARTH
SECTION E-E.
HALF ELEVATION
HALF SECTION D-D
SECTION B B
SECTION 6-6
DETAIL OF GRATING
DETAILS OF GRATING AND SETTING.
Grating to be fastened to angle with 3/8" chain and approved lock
Grating and angle to be painted as per Bridge Specifications
DETAILS OF LADDERS
HALF ELEVATION SOUTH WALL
HALF ELEVATION NORTH WALL
Ladder rungs to be made from 1" # I, cut 2-6" long, bent and set as shown
DETAILS OF CUT-OFF WALLS.
North cut-off wall to be extended easterly beyond excavation of old culvert as directed by the Engineer
CULVERT NO. 98
Contract No. 65.
Erie Canal
Section 10
AT MEDINA
DETAILS OF CULVERT AT STA. 4919+00
4918+40
Scales as Indicated
Examined and approved
Special Resident Engineer
Special Deputy State Engineer
8

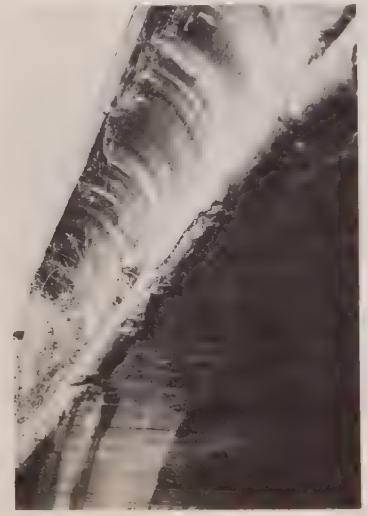


Entrance
Wall surface has partially scaled away

Exit
Canal towpath on top of wall. Note cracks and vegetation.

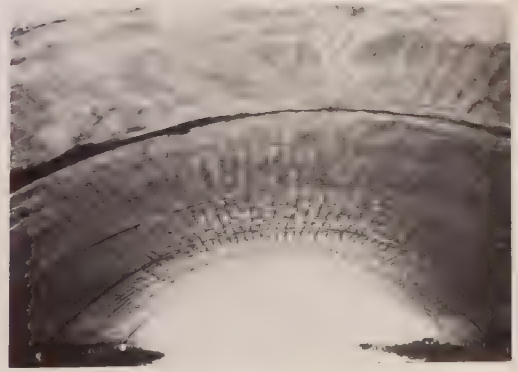


Edge of Arch Entrance
Note exposed steel bars and efflorescent covered cracks.

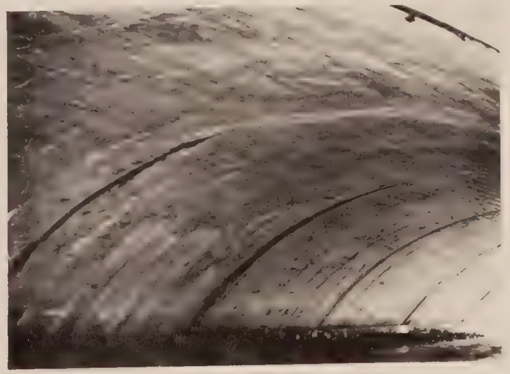


Edge of Arch Exit
Note scaling and efflorescent covered cracks.

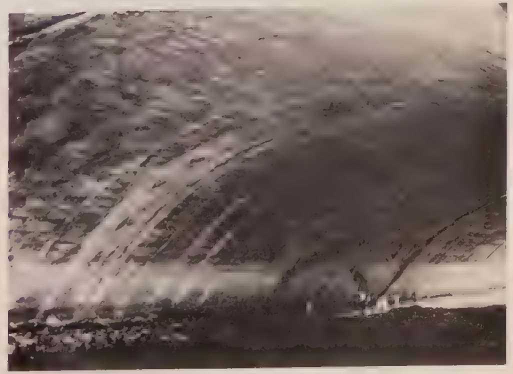
Culvert #99 (Medina Aqueduct)



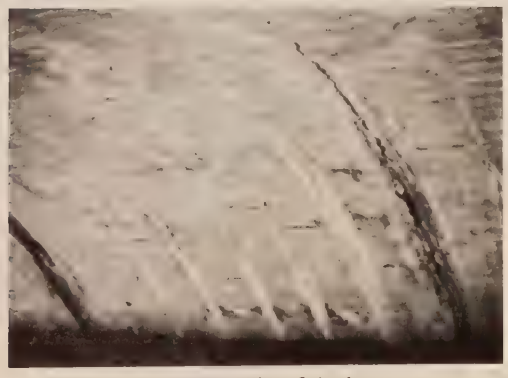
Looking North from Entrance



West Side of Arch



East Side of Arch
Note vertical efflorescent covered cracks at 3-4'·spacing on lower section of arch wall.

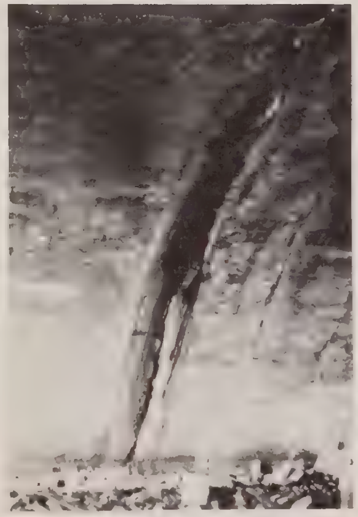


West Side of Arch
3-4' spacing of efflorescent covered cracks

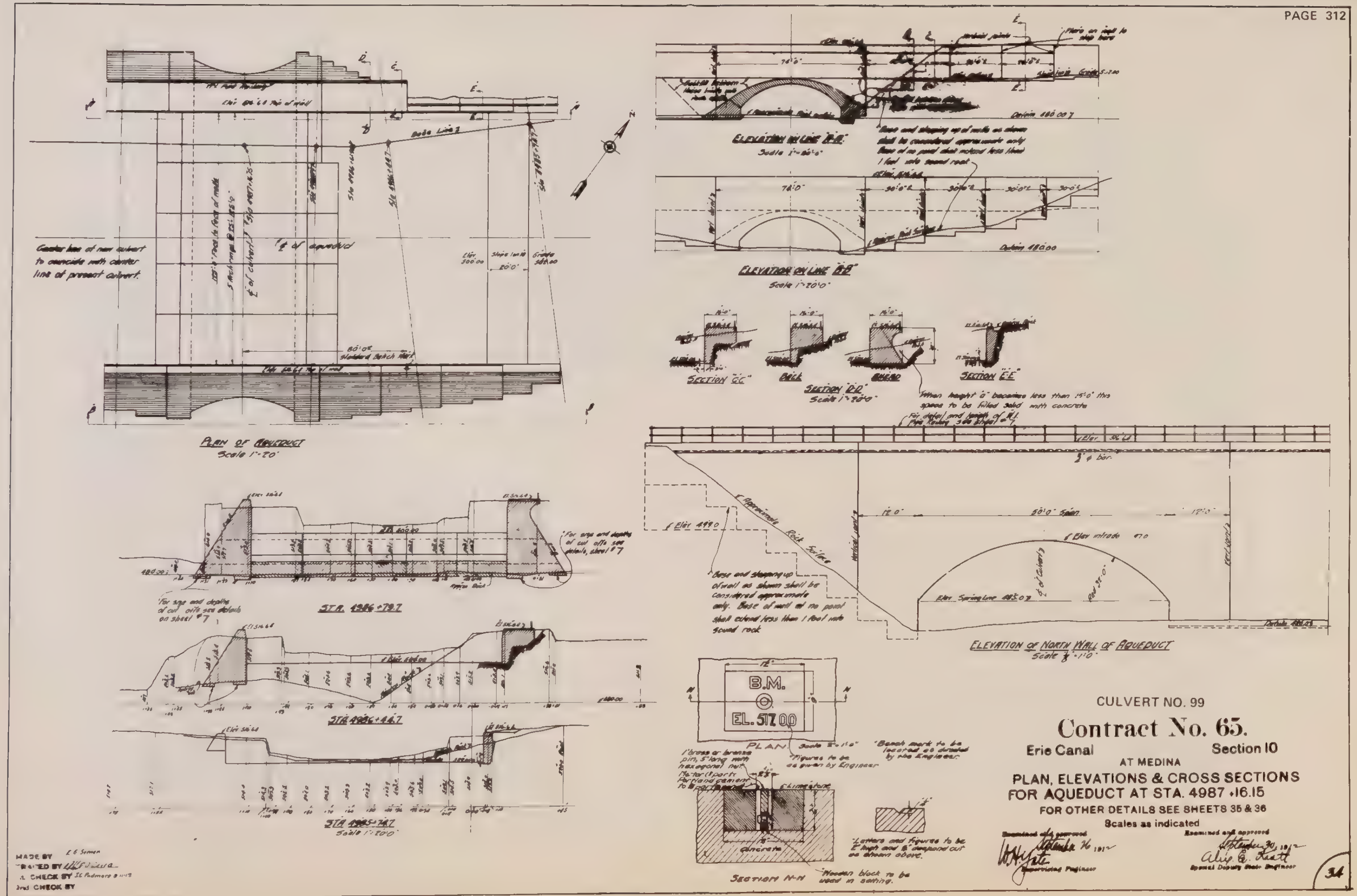
Retaining Wall on East Side Next to Entrance
Bottom of wall undermined. Large depression behind left end of wall.

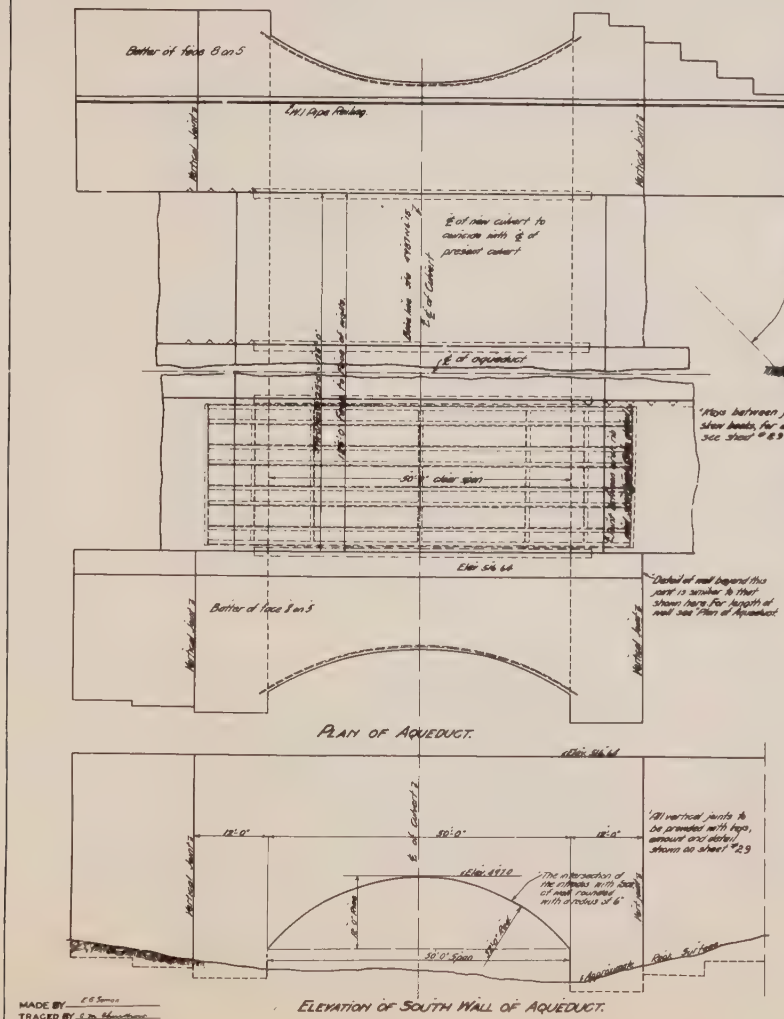
East Wall - 1st Joint from Entrance

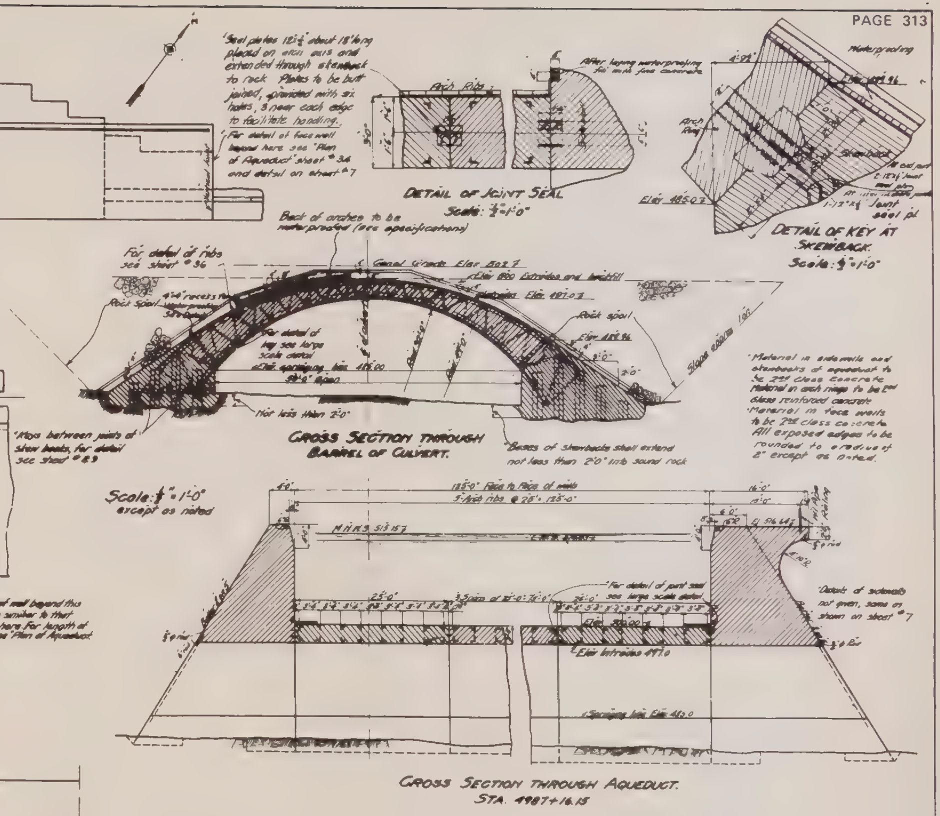
From south to north (entrance to exit) - 6 construction joints exist in the arch barrel. The 1st joint was 50% scaled to a depth of 6" mainly on the south side of the joint. There was no leakage, but it was damp on both sides. The 2nd joint was 5% scaled and in good condition. There were no leaks, but it was coated with efflorescence. The 3rd joint was 20% scaled to a depth of 3". There was no leakage. The 4th joint had scaled 4" deep along 30% of the joint length. No obvious leaking. No scaling or leakage at joint 5. There was, however, some efflorescence and joint was damp on west half of barrel. Joint 6 was scaled approximately 8" deep along 50% of the joint. The east end of the joint has one scaled area 8" wide by 1' deep by 3' long. Dripping seen along entire length of joint. On both sides of the arch, there were efflorescent covered cracks spaced 3-4' apart only on the interior arch sections, not on the entrance and exit arch trough wall sections. These cracks line up with the steel arch ribs encased in concrete. Some repairs are needed on this large culvert.



East Wall - 1st Joint From Exit


ELEVATION ON LINE "A-A"
Scale 1"=20'-0"
Datum 480.00
ELEVATION ON LINE "B-B"
Scale 1"=20'-0"
SECTION "C-C"
SECTION "D-D"
Scale 1"=20'-0"
SECTION "E-E"
When height "a" becomes less than 15'-0" this space to be filled solid with concrete
Center line of new culvert to coincide with center line of present culvert.
PLAN OF AQUEDUCT
Scale 1"=20'
ELEVATION OF NORTH WALL OF AQUEDUCT
Scale 1/8"=1'-0"
50'-0" Span
Approximate Rock Surface
STA. 4986+79.7
STA. 4986+44.7
STA. 4985+78.7
Scale 1"=20'-0"
B.M.
EL. 517.00
PLAN
SECTION N-N
Concrete
Limestone
Figures to be as given by Engineer
Bench mark to be located as directed by the Engineer
Wooden block to be used in setting
CULVERT NO. 99
Contract No. 65.
Erie Canal
Section 10
AT MEDINA
PLAN, ELEVATIONS & CROSS SECTIONS
FOR AQUEDUCT AT STA. 4987 +16.15
FOR OTHER DETAILS SEE SHEETS 35 & 36
Scales as indicated
Examined and approved
Supervising Engineer
Special Deputy State Engineer
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
34





QUANTITIES.

2nd Class Reinforced Concrete	1310 cu. yds
* 2nd Class Concrete	6830 cu. yds
Structural Steel	104,000 lbs.
Metal Reinforcement	320 lbs.
Pipe Railing	140 lin. ft.

* Assumes base of structure at elevation shown on plans.

CULVERT NO. 99

Contract No. 65.

Erie Canal — Section 10

AT MEDINA

DETAILS OF AQUEDUCT AT STA. 4987 +16.15

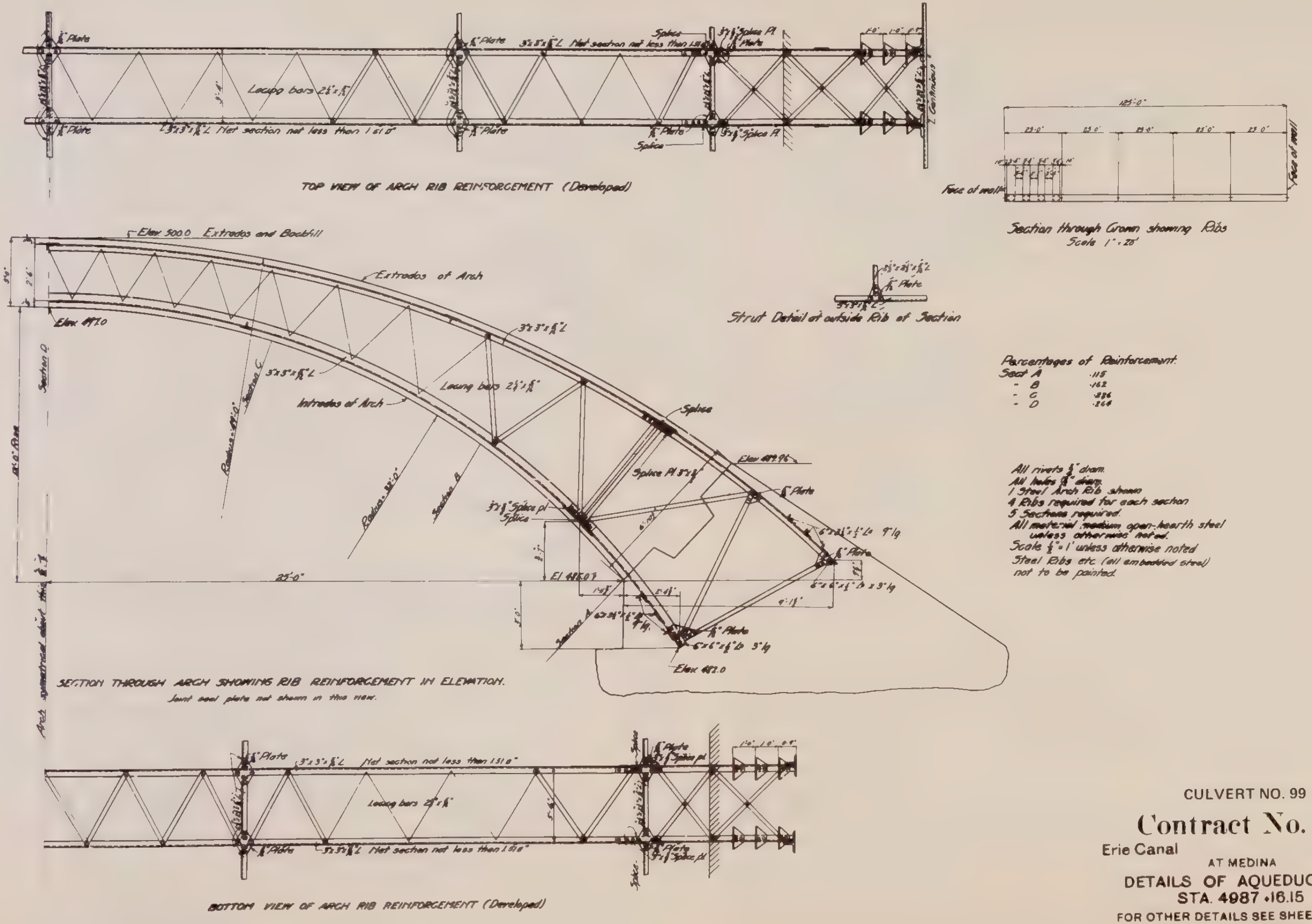
FOR OTHER DETAILS SEE SHEETS 34 & 36

Scales as indicated

Examined and approved September 26, 1912 W. H. Yates, Supervising Engineer

Examined and approved September 30, 1912 Special Deputy State Engineer

MADE BY E. G. Symon
TRACED BY
1st CHECK BY
2nd CHECK BY



CULVERT NO. 99

Contract No. 65.

Erie Canal Section 10

AT MEDINA

DETAILS OF AQUEDUCT AT
STA. 4987 +16.15

FOR OTHER DETAILS SEE SHEETS 34 & 35

Scales as indicated

Examined and approved — Supervising Engineer

Examined and approved — Special Deputy State Engineer

36

Culvert #99½ 500'+ of Stone Block Arch
Not Inspected

Storm sewer built by Town of Medina.
Manhole entrances on both sides of canal.

See Introduction - Canal Culverts
It is not known if any plans for this old culvert still exist.

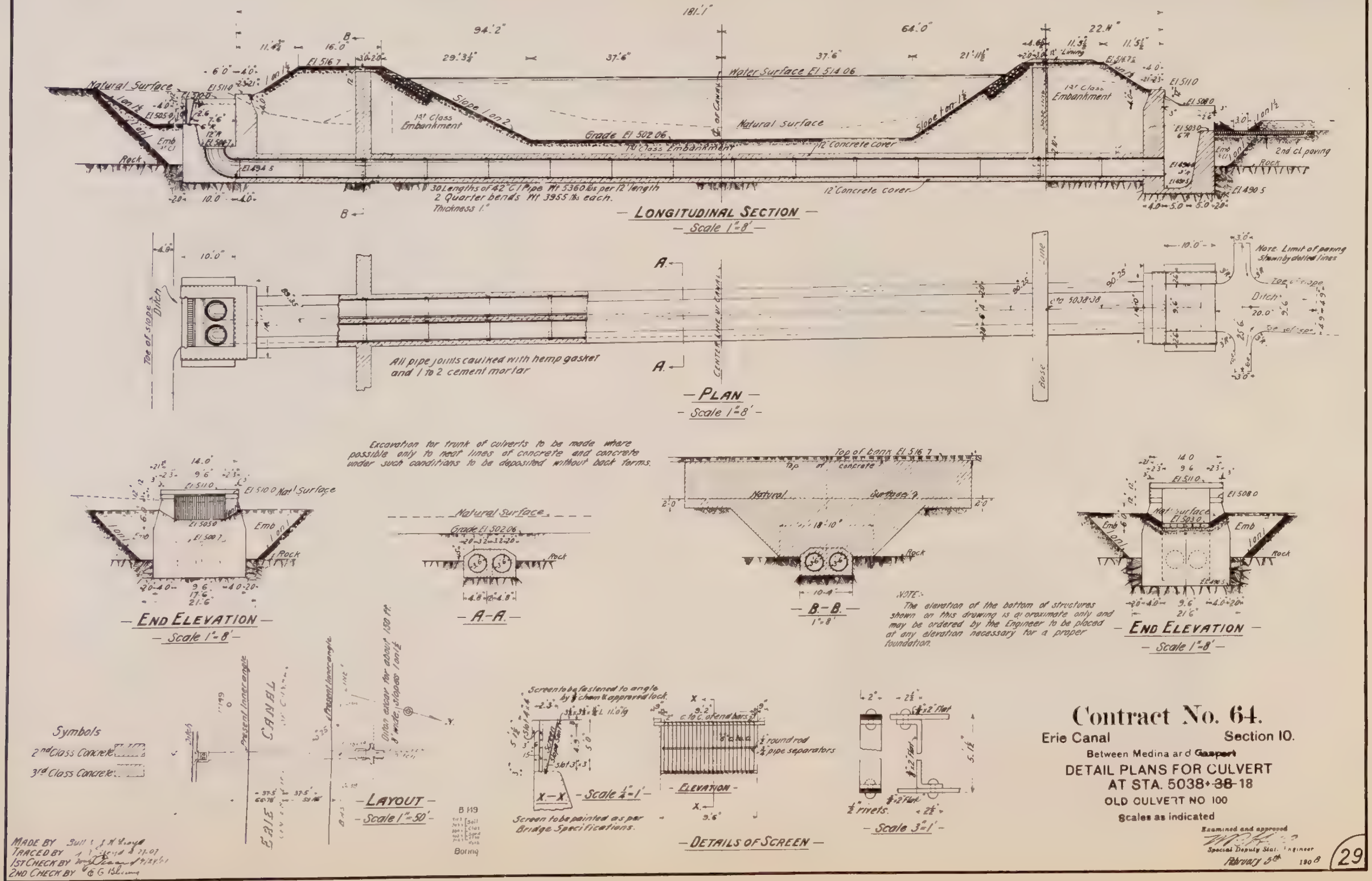
Entrance Manhole

Exit Manhole in Glenwood Avenue

Culvert #100 (Dive) 185' of Twin 42" Cast Iron Pipe
Not Inspected

Exit

Headwall in fair condition with many efflorescent covered cracks on bottom half. Left wingwall in poor condition with many efflorescent covered cracks and end scaled up to 6 inches deep. Right wingwall in fair condition with many efflorescent covered cracks on bottom half only and end scaled up to 4 inches deep.



– LONGITUDINAL SECTION –
– Scale 1"=8' –
Water Surface El 514.06
Natural Surface
Natural surface
Grade El 502.06
1st Class Embankment
Slope 1 on 2
Slope 1 on 1½
12" Concrete cover
30 Lengths of 42" C.I. Pipe Wt 5360 lbs per 12' length
2 Quarter bends Wt 3955 lbs each.
Thickness 1"
2nd cl paving
Rock
– PLAN –
– Scale 1"=8' –
All pipe joints caulked with hemp gasket and 1 to 2 cement mortar
Center Line of Canal
Base Line
Toe of slope
Ditch
Note: Limit of paving shown by dotted lines
Excavation for trunk of culverts to be made where possible only to neat lines of concrete and concrete under such conditions to be deposited without back forms.
– END ELEVATION –
– Scale 1"=8' –
– A-A –
– B-B –
Top of bank El 516.7
NOTE:
The elevation of the bottom of structures shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.
Symbols
2nd Class Concrete
3rd Class Concrete
CANAL
ERIE CANAL
Present Inner angle
Ditch excav for about 150 ft 8' wide, slopes 1 on 1½
– LAYOUT –
– Scale 1"=50' –
Boring
Screen to be fastened to angle by ⅜" chain & approved lock.
X–X – Scale ½"=1' –
Screen to be painted as per Bridge Specifications.
¾" round rod
¼" pipe separators
– ELEVATION –
– DETAILS OF SCREEN –
½" rivets.
– Scale 3"=1' –
Contract No. 64.
Erie Canal
Section 10.
Between Medina and Gasport
DETAIL PLANS FOR CULVERT
AT STA. 5038+38-18
OLD CULVERT NO 100
Scales as indicated
Examined and approved
Special Deputy State Engineer
February 5th 1908
MADE BY
TRACED BY
1ST CHECK BY
2ND CHECK BY

Culvert #101 204.5' of Twin 42" Cast Iron Pipe
Not Inspected

Exit

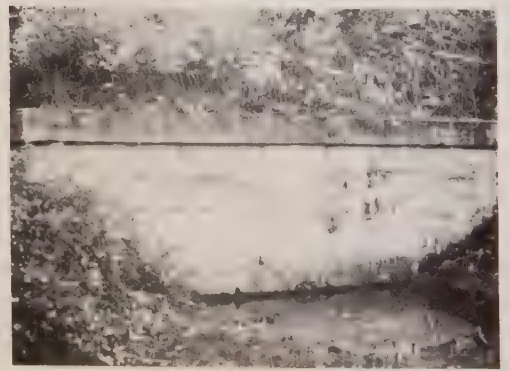
Concrete in headwall appeared to be in good condition, but the headwall was tilted. Half full of sewer water. Pipes appeared to be clean. 2-3" active syphons.

Headwall Tilted

A 2' diameter tree stump was seen at each end of the headwall. The trees apparently caused the headwall to tilt about 1' at the top.

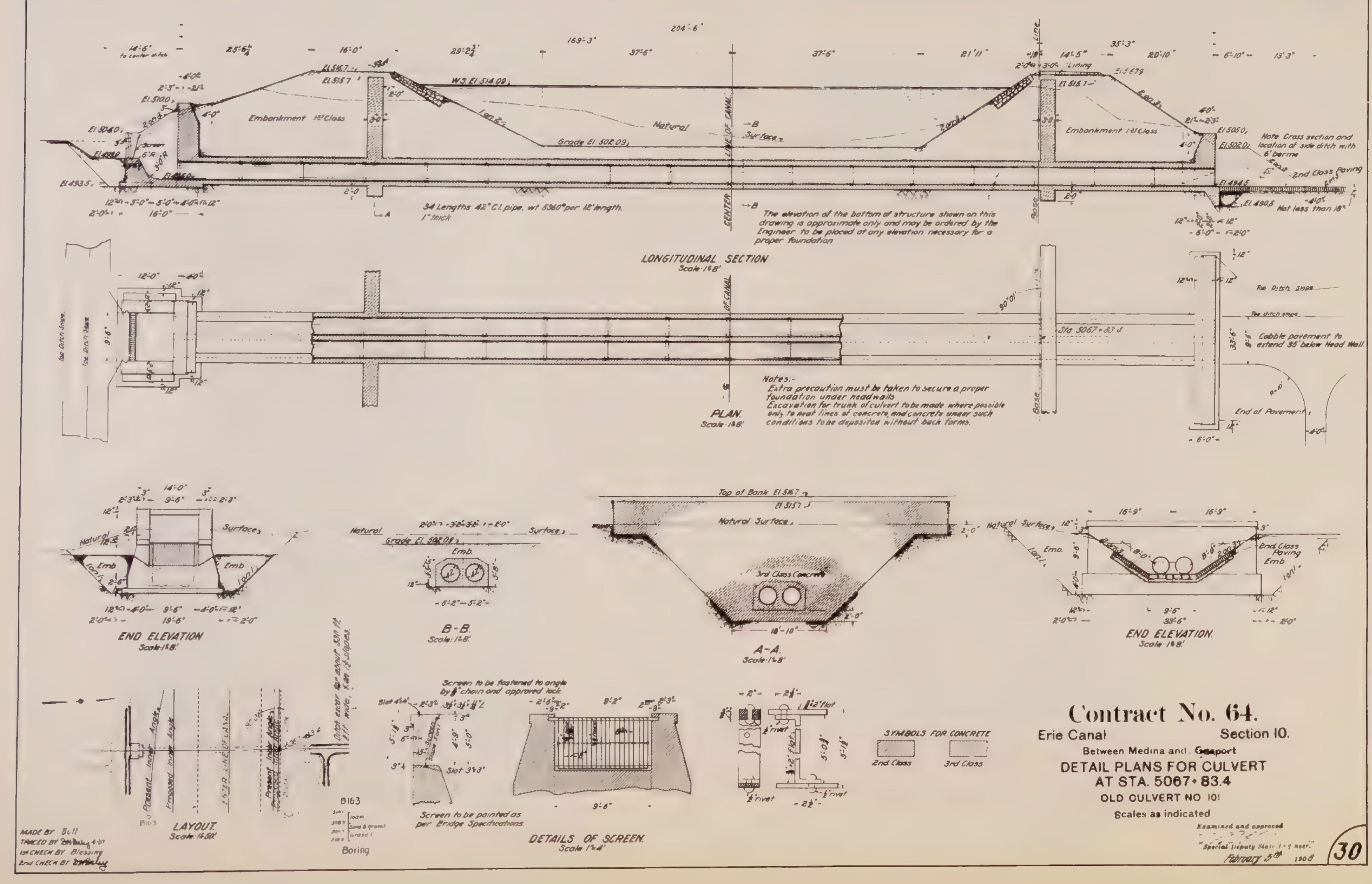
Culvert #102 196' of 36" Cast Iron Pipe
Not Inspected

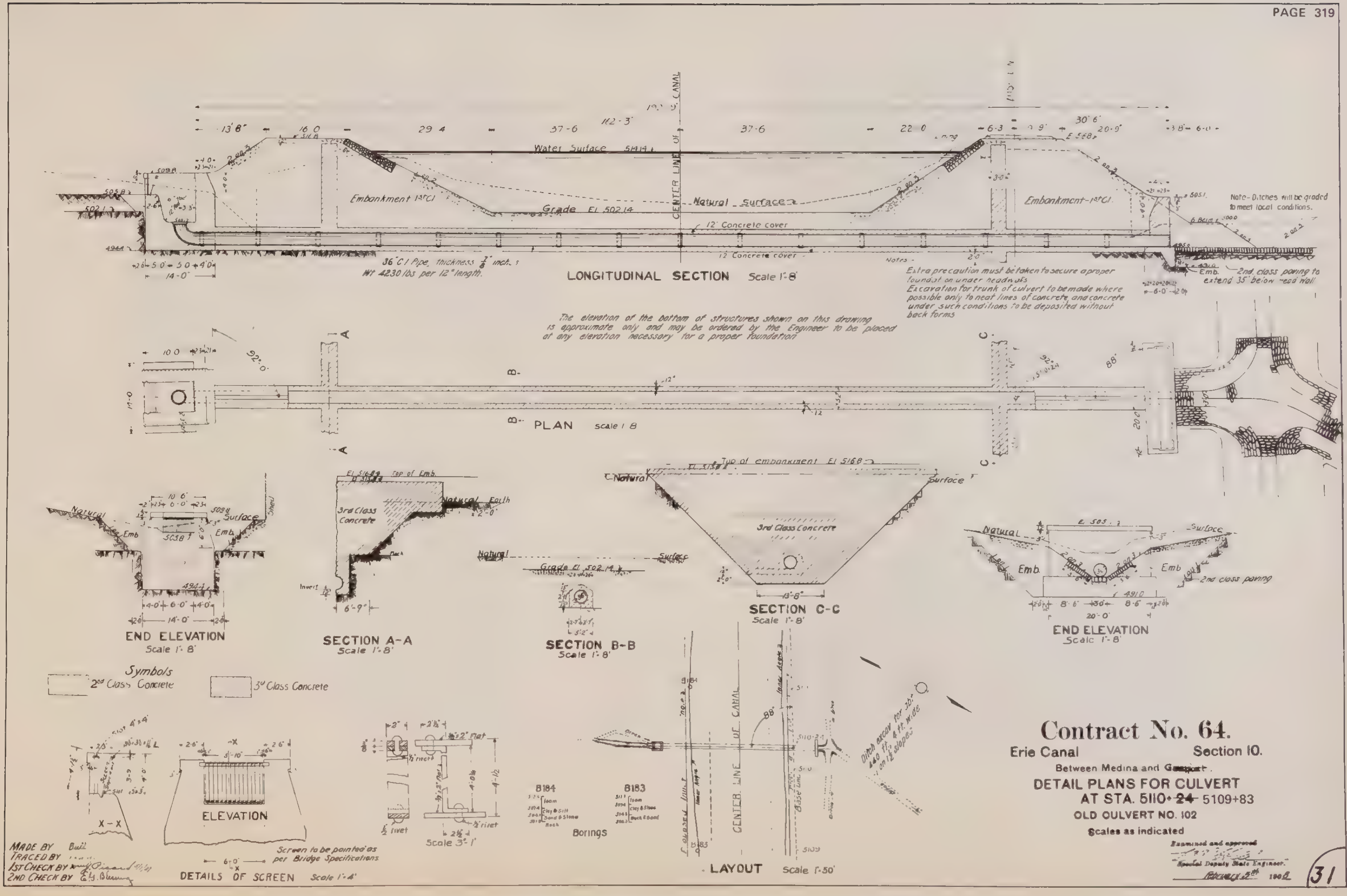
Recently rebuilt grated entrance



Exit

Headwall appeared to have been refaced with 1-3" of concrete. Facing was now delaminated and cracked. Top of pipe 6" under water. Drainage channel needs cleaning.


LONGITUDINAL SECTION
Scale 1"=8'
Embankment 1st Class
Natural
Surface
Grade El 502.09
W.S. El 514.09
CENTER LINE OF CANAL
34 Lengths 42" C.I. pipe, wt 5360# per 12' length, 1" thick
The elevation of the bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation
Note Cross section and location of side ditch with 6' berme
2nd Class Paving
Not less than 18"
PLAN.
Scale 1"=8'
Notes.-
Extra precaution must be taken to secure a proper foundation under headwalls
Excavation for trunk of culvert to be made where possible only to neat lines of concrete, and concrete under such conditions to be deposited without back forms.
Sta 5067+83.4
Cobble pavement to extend 35' below Head Wall.
End of Pavement
END ELEVATION
Scale 1"=8'
B-B.
Scale 1"=8'
Top of Bank El 516.7
Natural Surface
3rd Class Concrete
A-A.
Scale 1"=8'
END ELEVATION.
Scale 1"=8'
LAYOUT.
Scale 1"=50'
Boring
Screen to be fastened to angle by 1/4" chain and approved lock.
Screen to be painted as per Bridge Specifications.
DETAILS OF SCREEN.
Scale 1"=4'
SYMBOLS FOR CONCRETE
2nd Class
3rd Class
Contract No. 64.
Erie Canal
Section 10.
Between Medina and Gasport
DETAIL PLANS FOR CULVERT
AT STA. 5067+83.4
OLD CULVERT NO 101
Scales as indicated
MADE BY Bull
TRACED BY
1st CHECK BY Blessing
2nd CHECK BY
Examined and approved
Special Deputy State Eng'r.
February 5th 1908
30

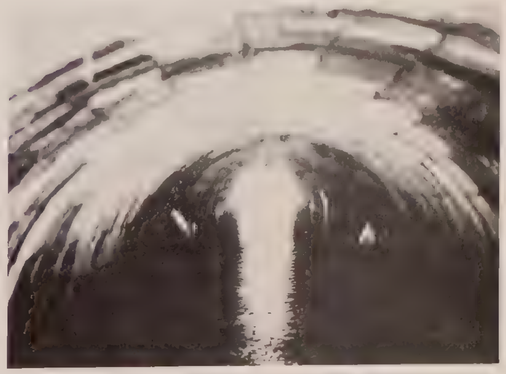


CENTER LINE OF CANAL
Water Surface 514.14
Embankment 1st Cl.
Natural Surface
Grade El. 502.14
12" Concrete cover
Embankment-1st Cl.
36" C.I. Pipe, thickness 7/8 inch.
Wt. 4230 lbs per 12" length.
LONGITUDINAL SECTION Scale 1"-8'
Note - Ditches will be graded to meet local conditions.
2nd class paving to extend 3.5' below end wall
Extra precaution must be taken to secure a proper foundation under headwalls
Excavation for trunk of culvert to be made where possible only to neat lines of concrete and concrete under such conditions to be deposited without back forms
The elevation of the bottom of structures shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation
PLAN Scale 1"-8'
END ELEVATION Scale 1"-8'
SECTION A-A Scale 1"-8'
3rd Class Concrete
SECTION B-B Scale 1"-8'
Top of embankment El. 516.8
3rd Class Concrete
SECTION C-C Scale 1"-8'
END ELEVATION Scale 1"-8'
2nd class paving
Symbols
2nd Class Concrete
3rd Class Concrete
X-X
ELEVATION
Screen to be painted as per Bridge Specifications
DETAILS OF SCREEN Scale 1"-4'
Scale 3"-1'
B184
B183
Borings
CENTER LINE OF CANAL
LAYOUT Scale 1"-50'
Ditch excav. for 3.5' to 4 ft. wide 1 on 1½ slopes
MADE BY Bull
TRACED BY
1ST CHECK BY
2ND CHECK BY
Contract No. 64.
Erie Canal
Section 10.
Between Medina and Gasport.
DETAIL PLANS FOR CULVERT
AT STA. 5110+24 5109+83
OLD CULVERT NO. 102
Scales as indicated
Examined and approved
Special Deputy State Engineer.
1908
31

Culvert #103 174' of 12' Wide X 10' High Stone Block Arch and
59' of Concrete Arch

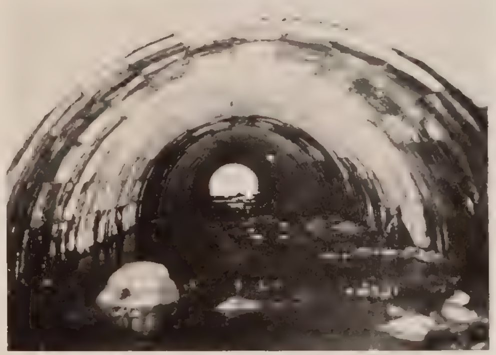
Entrance
Headwall and wingwalls in fair condition due to areas of efflorescent covered cracks.

Exit
Headwall and right wingwall in fair condition due to many efflorescent covered cracks. Left wingwall in good condition, except for top next to headwall.

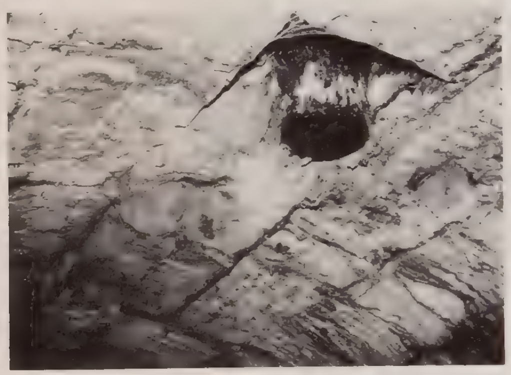


Looking North from Entrance
Approximately 6 large leaks seen in 1975

Exposed Top of Arch Barrel - April 1976, Looking South.
Back side of 1825 Erie Canal culvert headwall. Arch in foreground was covered with concrete many years ago. In 1976, the 10' in front of the headwall was covered with concrete. This stopped a few leaks, but another 30' of uncovered stone block arch exists on the other side of the Erie headwall where most leaks exist.

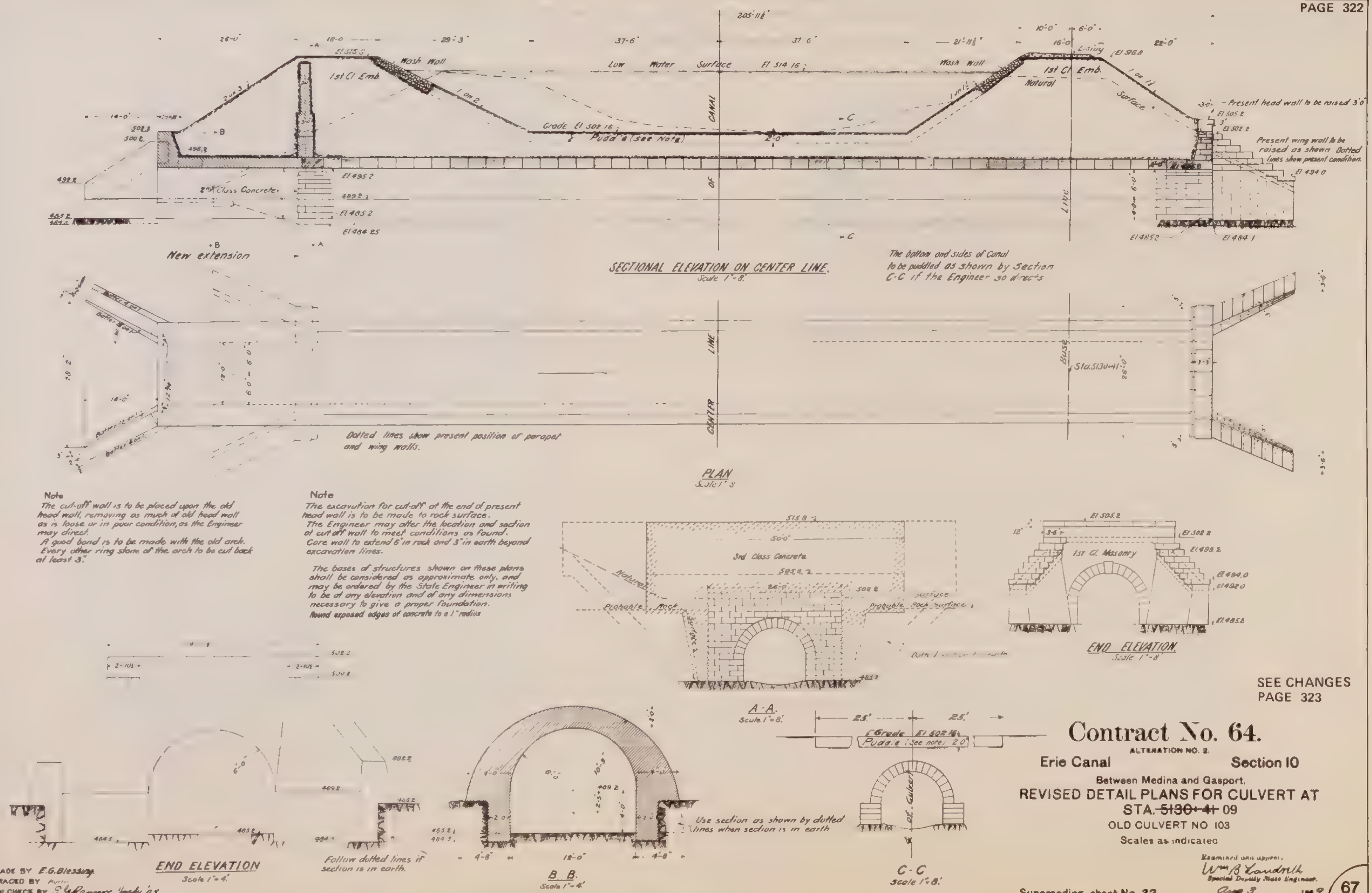


Looking North from Entrance
After repairs in 1976, a few leaks stopped, but others remained. Note heavy drippage in foreground and water squirting out right wall in 2 places part way down the barrel.



Stone Block Arch Area at Center Drain
1' square hole 3' up alongside pipe. No leaks.
1' X 4' block has dropped 3-4". Top of arch capped with concrete.

At the south (entrance) end, the 30' long concrete arch was in good condition. Heavy drippage at joint with stone blocks. Near joint, 2 blocks had 1' square, 10" deep holes. Heaviest leakage occurred about 75' from the south entrance. 6 or more good size leaks were evident mainly in the south 1/3 of the stone block section. Approximately 6 places where a block has partially fallen out. Adjacent to the north end concrete arch, a 1 foot square block has dropped 1". At the center drain, a 1' X 4' stone block has dropped 3-4". A 1' square hole existed 3' up along side the 8" diameter drain. This hole may have been made during drain installation. Whole area must be thoroughly capped with concrete around top of center drain as no leaks existed here. Many blocks have cracked horizontally along bedding planes a few inches apart. North end concrete arch was in good condition. Repairs needed.



Note

The cut-off wall is to be placed upon the old head wall, removing as much of old head wall as is loose or in poor condition, as the Engineer may direct.
A good bond is to be made with the old arch.
Every other ring stone of the arch to be cut back at least 3".

Note

The excavation for cut-off at the end of present head wall is to be made to rock surface.
The Engineer may alter the location and section of cut-off wall to meet conditions as found.
Core wall to extend 6" in rock and 3" in earth beyond excavation lines.

The bases of structures shown on these plans shall be considered as approximate only, and may be ordered by the State Engineer in writing to be at any elevation and of any dimensions necessary to give a proper foundation.
Round exposed edges of concrete to a 1" radius

SEE CHANGES PAGE 323

Contract No. 64.

ALTERATION NO. 2.

Erie Canal — Section 10

Between Medina and Gasport.

REVISED DETAIL PLANS FOR CULVERT AT STA. ~~5130+41~~ 09

OLD CULVERT NO 103

Scales as indicated

MADE BY E.G. Blessing
TRACED BY
1st CHECK BY
2nd CHECK BY

Superseding sheet No. 32.

Examined and approved,
Wm B Landreth
Special Deputy State Engineer.

TILE DRAINS AND DITCHING

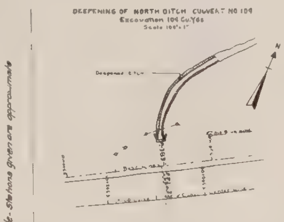
STATION	EXCAVATION (CU YDS)	FIRST CLASS EMBANKMENT (CU YDS)	6" TILE (LIN FT)	12" TILE (LIN FT)
5397+44	6	5	30	
5356+00	50	5	20	
5352+00	50	5	20	
5350+00	50	8	20	
5347+00	50	3	20	
5326+00	30	20	40	
5328+00	30	30		40
5306+00	30	30	40	
5303+50	30	30	40	
5293+50	30	30	40	
5288+00	30	30	40	
5271+00	30	30	36	
5265+00	30	30	40	
5240+10	30	30	38	
5231+50	30	30	36	
5117+00	18	18	24	
5115+00	30	30	50	
5088+00	18	18	28	
5080+00	100	80	50	
Contingent	100		50	
TOTALS	780	399	656	40

DEEPENING DITCHES LOCATION AS IN ORIGINAL CONTRACT

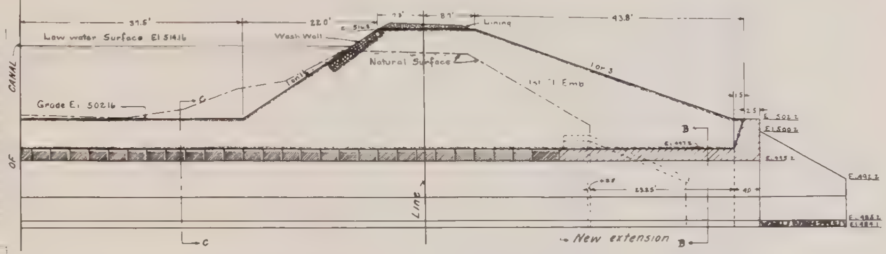
BANK	STATION	GRADE Orig	GRADE Alt 12	DEEPENING	EXCAVATION (CU YDS) Orig	EXCAVATION (CU YDS) Alt 12	EXCAVATION (CU YDS) Increase
Berme	5221						
	5220	507.0	505.8	1.2			
	5206	511.2	508.6	2.6	288.0	2434.0	2146.0
Berme	5160						
	5150	506.5	506.5	0.0			
	5133	504.6	502.6	2.0			
	5131				1293.0	2633.0	1340.0
Berme	5110	508.0	506.0				
	5108	510.0	508.0				
	5107	510.6	508.6	2.0			
	5095	512.0	510.8				
	5093+25		512.0		962.0	2810.0	1848.0
Berme	5064	508.8	507.6				
	5068	509.8	508.0	1.8			
	5057				96.0	262.0	166.0
Berme	5051						
	5049	511.3	509.8	1.5			
	5039	508.1	508.1	0.0			
	5038	508.9	508.5	0.4			
	5026	508.1	510.9	1.8	1681.0	2134.0	453.0
				Totals (cu yds)	4320.0	10268.0	5948.0

Authorized by letter from Division Eng. Govern, dated June 13, 1912

Note - Stations given are approximate

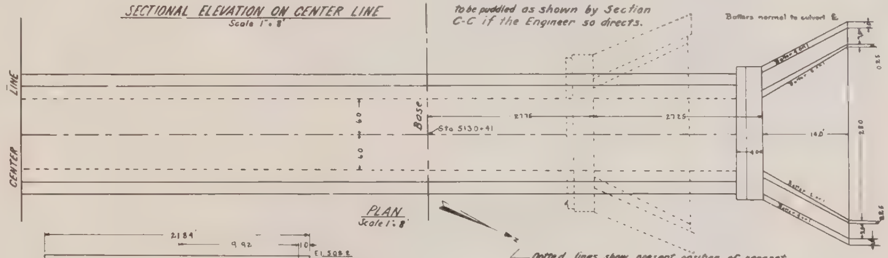


NORTH EXTENSION-CULVERT NO. 103



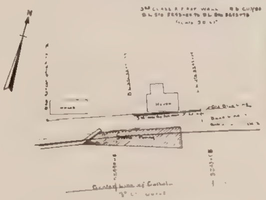
SECTIONAL ELEVATION ON CENTER LINE
Scale 1" = 8'

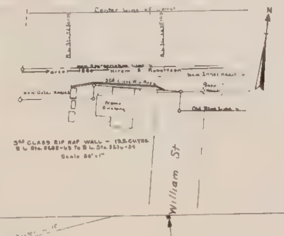
The bottom and sides of Canal to be puddled as shown by Section C-C if the Engineer so directs.

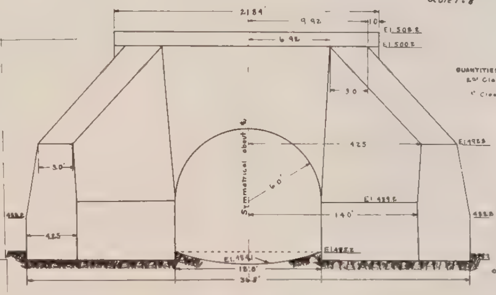


PLAN
Scale 1" = 8'

Dotted lines show present position of parapet and wing walls.

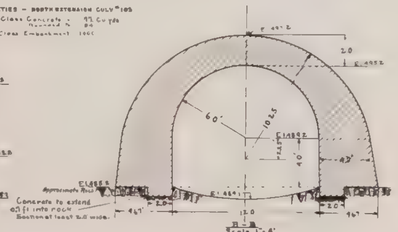






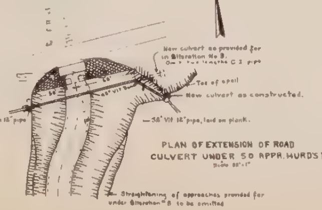
END ELEVATION
Scale 1" = 4'

QUANTITIES - NORTH EXTENSION CULV. 103



B-B
Scale 1" = 4'

QUANTITIES — HURD'S BRIDGE



PLAN OF EXTENSION OF ROAD CULVERT UNDER S.O. APPR. HURD'S BR.

The bases of structures shown on these plans shall be considered as approximate only and may be ordered by the State Engineer in writing to be at any elevation and of any dimensions necessary to give a proper foundation.

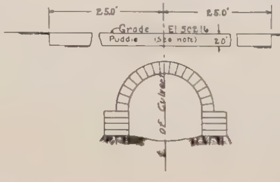
Round exposed edges of concrete to a 1" radius.

A good bond is to be made with the old arch.

Every other ring stone of the arch to be cut back at least 5".

This sheet supersedes sheets 32 and 67

Plans for Alt 12 supersede preceding sheets when in conflict.



C-C
Scale 1" = 8'

MADE BY
TRACED BY
CHECKED BY

Contract No. 64.

ALTERATION NO. 12

Erie Canal — Section 10

PLAN OF EXTENSION OF NORTH END OF CULVERT NO. 103 & OTHER DETAILS

Scales as indicated

H. D. Alexander
Special Resident Engineer
April 3rd 1914

Examined and approved
April 1914
Special Deputy State Engineer

Culvert #104 214' of 36" Cast Iron Pipe

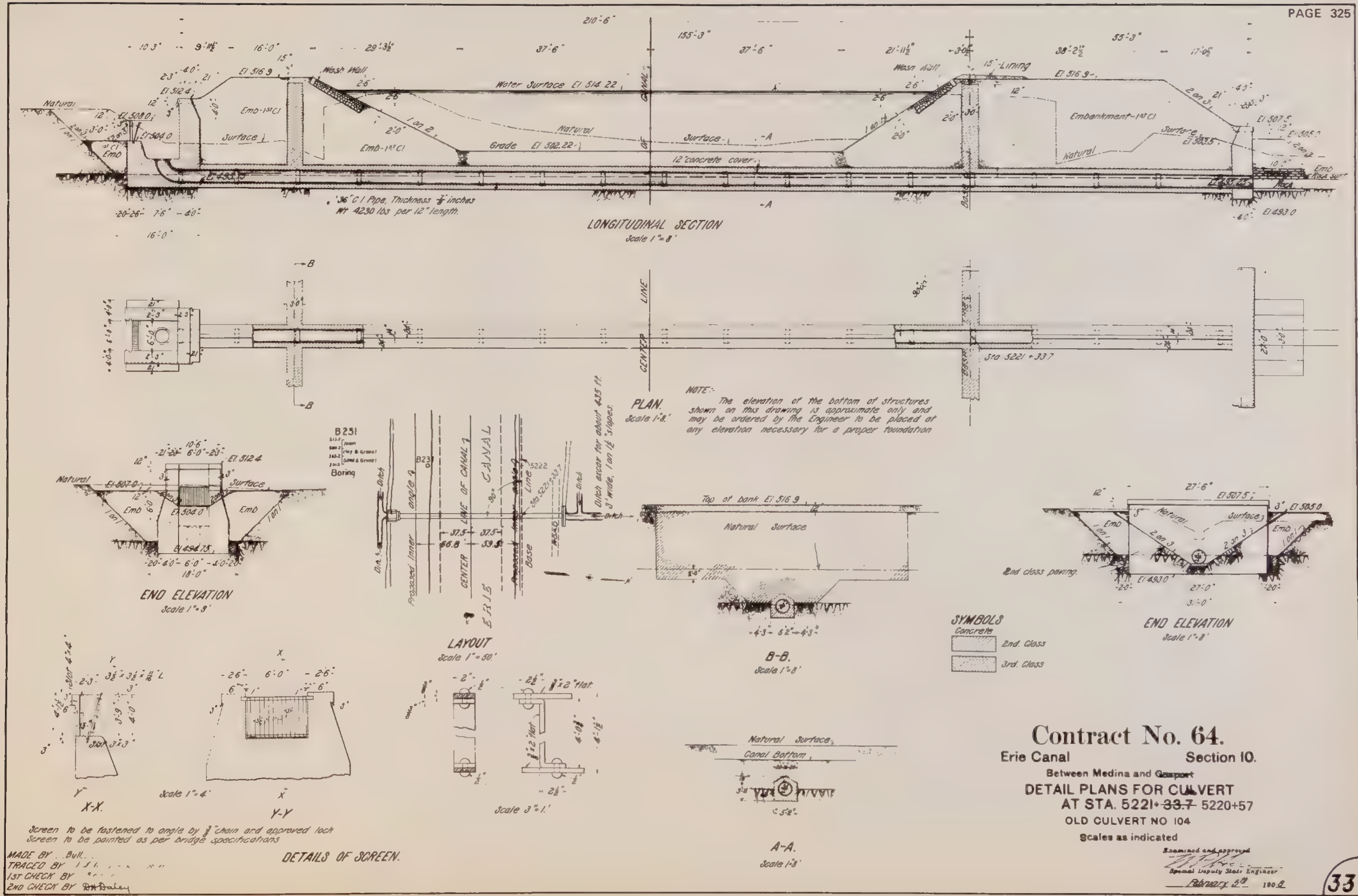
Entrance
Headwall and wingwalls in good condition. A few efflorescent covered cracks on right wingwall.

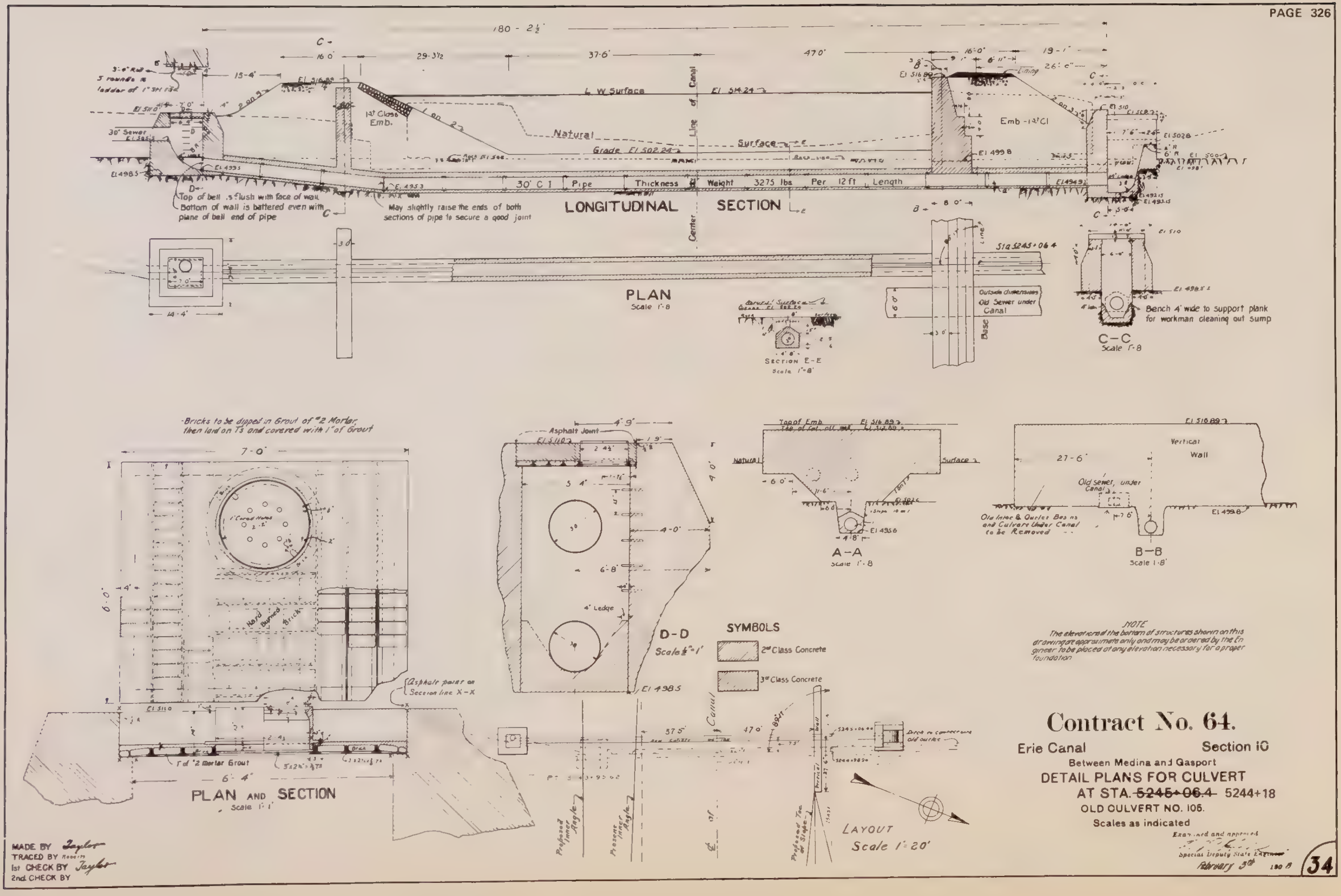
Exit
Headwall in fair to good condition with a few cracks and scaled areas around culvert barrel.

Cast iron pipe culvert in good condition. ½" thick steel plate patch near center ready to fall off, but probably another one exists on the outside and the pipe is encased in 1' of concrete. 8" flowing pipe from sewage treatment plant runs into entrance. Pipe 1/3 filled with mud. No leaks.

Culvert #105 (Dive) 180' of 30" Cast Iron Pipe
Not Inspected

Exit
Headwall and wingwalls in good condition. Note culvert well covered with planks.


LONGITUDINAL SECTION
Scale 1" = 8'
Water Surface El 514.22
Wash Wall
Emb-1st Cl
Natural
Surface
Grade El 502.22
12" concrete cover
Embankment-1st Cl
15" Lining
El 516.9
36" C I Pipe, Thickness 1/2 inches
Wt 4230 lbs per 12" length.
CENTER LINE
PLAN.
Scale 1" = 8'
Sta 5221 + 33.7
NOTE:- The elevation of the bottom of structures shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation
B231
Boring
CENTER LINE OF CANAL
ERIE CANAL
Proposed Inner
Base
Ditch excav for about 435 ft. 3' wide, 1 on 1½ slopes.
LAYOUT
Scale 1" = 50'
END ELEVATION
Scale 1" = 8'
Top of bank El 516.9
Natural Surface
B-B.
Scale 1" = 8'
2nd class paving.
SYMBOLS
Concrete
2nd. Class
3rd. Class
END ELEVATION
Scale 1" = 8'
X-X.
Scale 1" = 4'
Y-Y
Scale 3" = 1'
Natural Surface
Canal Bottom
A-A.
Scale 1" = 8'
Screen to be fastened to angle by ⅜" chain and approved lock
Screen to be painted as per bridge specifications
DETAILS OF SCREEN.
MADE BY Bull
TRACED BY
1ST CHECK BY
2ND CHECK BY
Contract No. 64.
Erie Canal
Section 10.
Between Medina and Gasport
DETAIL PLANS FOR CULVERT
AT STA. 5221+33.7 5220+57
OLD CULVERT NO 104
Scales as indicated
Examined and approved
Special Deputy State Engineer


LONGITUDINAL SECTION
L W Surface
El 514.24
Natural
Surface
Grade El 502.24
1st Class Emb.
Emb - 1st Cl
30" C I Pipe Thickness Weight 3275 lbs Per 12 ft Length
Center Line of Canal
Top of bell is flush with face of wall
Bottom of wall is battered even with plane of bell end of pipe
May slightly raise the ends of both sections of pipe to secure a good joint
PLAN
Scale 1"-8'
Outside dimensions Old Sewer under Canal
Sta 5245+06.4
SECTION E-E
C-C
Scale 1"-8'
Bench 4' wide to support plank for workman cleaning out sump
Bricks to be dipped in Grout of #2 Mortar, then laid on 1's and covered with 1" of Grout
Hard Burned Brick
Asphalt paint on Section line X-X
1" of #2 Mortar Grout
PLAN AND SECTION
Scale 1"-1'
Asphalt Joint
4' Ledge
D-D
El 498.5
SYMBOLS
2nd Class Concrete
3rd Class Concrete
Top of Emb.
Natural
Surface
A-A
Scale 1"-8'
Vertical Wall
Old sewer, under Canal
Old Inlet & Outlet Basins and Culvert Under Canal to be Removed
B-B
Scale 1"-8'
NOTE
The elevation of the bottom of structures shown on this drawing are approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation
Proposed Inner Angle
Present Inner Angle
Proposed Toe of Slope
LAYOUT
Scale 1"=20'
Contract No. 64.
Erie Canal
Section 10
Between Medina and Gasport
DETAIL PLANS FOR CULVERT
AT STA. 5245+06.4 5244+18
OLD CULVERT NO. 105.
Scales as indicated
Examined and approved
Special Deputy State Engineer
February 5th 1908
MADE BY Taylor
TRACED BY Roberts
1st CHECK BY Taylor
2nd CHECK BY
34

Culvert #107 147' of Twin 12' Wide X 5' High Stone Block Arch

Exit Area

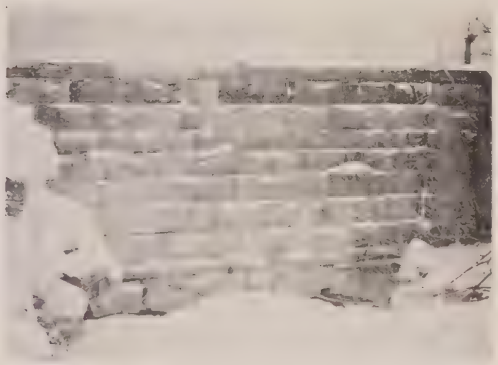
Looking North Along North Embankment in Middleport
Culvert #107 exit is located in the distance by the 3rd telephone pole.

Exit
Headwall was in fair condition with a number of efflorescent covered cracks. Dark circular holes are weep drains.

The north embankment in Middleport is narrow and steep due to the nearness of the road and homes. It does not meet current criteria for canal embankments. Plans are now under design for the reinforcing of this embankment area.

Exit
View of exit area from under roadway bridge.

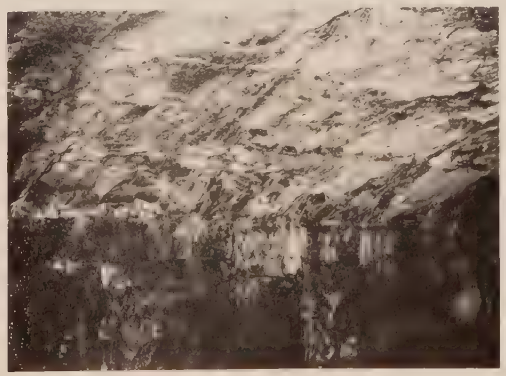
Culvert #107
Entrance Area



Stone Block Retaining Wall over Culvert #107 Entrance. Middleport Waste Gate is at right.

Culvert #107 Entrance
Stream in foreground (very little flow) cascades over 5' high wall and down into culvert well. Water at right is flowing from canal waste gate. Floor of culvert is bedrock.

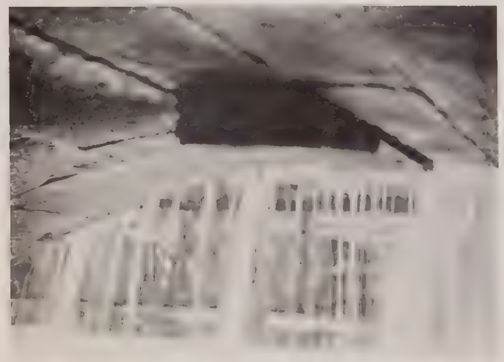
Unstable Stone Blocks on Left Side of Entrance Area



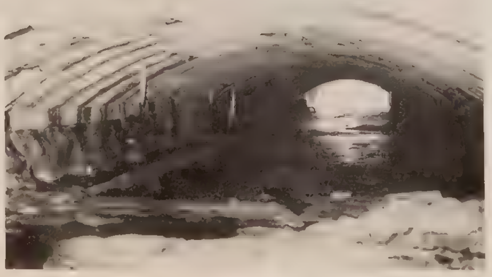
East Barrel Near Exit End
Stone blocks are breaking apart and pieces are slowly falling out. There were only a few areas like this, of which the above was probably the worst.

Culvert #107
West Barrel

West Barrel Entrance
Heavy leakage through retaining wall and keystone in arch has slipped down a little. Picnic table was washed or thrown into culvert entrance.



Looking Out West Barrel Entrance-Fall 1975
Not only had the keystone slipped, but the stone behind it had also fallen down about 5".



West Barrel-Looking North Toward Exit
Note 12" diameter sewer pipe along west side.

Looking Out West Barrel Entrance-Winter 1977
A year later, part of another stone block had slipped down just inside the entrance.

Culvert #107
East Barrel

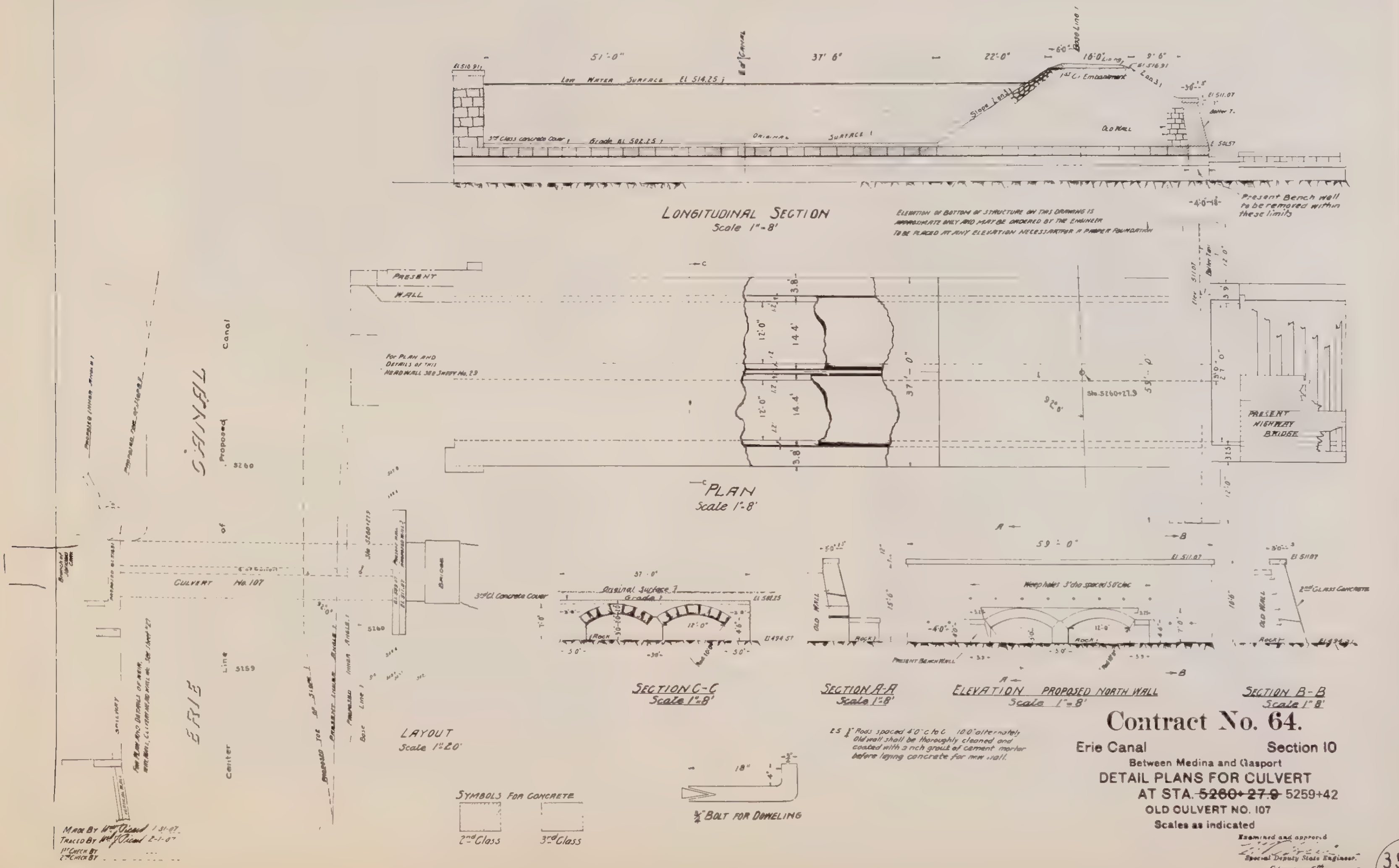
East Barrel Entrance
Keystone has partially fallen out as well as sections at west end of arch. There also appears to be a slight dip in the horizontal wall joints above the entrance.

East Side of East Barrel Entranceway
Many cracked and partially missing stone blocks.

West Side of East Barrel Entranceway
Many cracked and partially missing stone blocks.

Both barrels of this culvert were in similar condition. Generally, the stone block arches appeared in good condition, except at the entrances. There was minor drippage throughout the northern 2/3rds, but the southern 1/3rd (entrance end) contained a number of drip size streams and constant drippage. The entrance area has a number of fractured and partially missing stone blocks, and is in danger of collapse.

Work is presently underway by Canal Maintenance Personnel to repair the entrance area of this culvert. The ends of both barrels are to be lined with corrugated metal and leaks through the retaining wall sealed.



Contract No. 64.

Erie Canal — Section 10

Between Medina and Gasport

DETAIL PLANS FOR CULVERT

AT STA. ~~5260+27.9~~ 5259+42

OLD CULVERT NO. 107

Scales as indicated

Examined and approved

Special Deputy State Engineer.

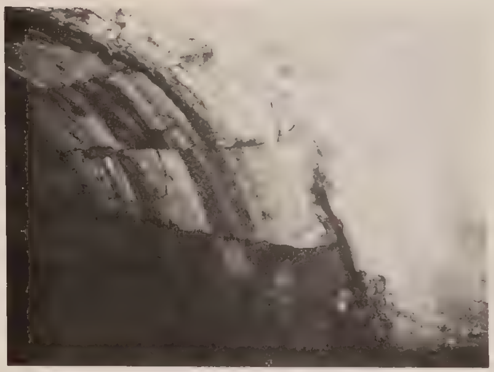
Culvert #108 (Dive) 197.5' of 42" Cast Iron Pipe
Not Inspected

Exit
Headwall and wingwalls in fair to good condition. Left wingwall had more cracks than right wingwall.

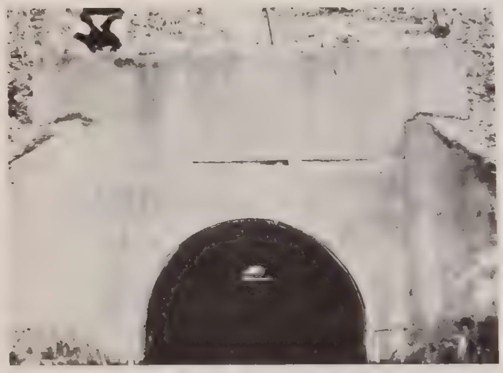
Culvert #109 231' of 9' High X 7' Wide Stone Block Arch

Entrance Area
Abandoned mill collapsed into culvert entranceway and had to be cleaned out. Water at left from Watsons Waste Gate. Headwall and right wingwall in fair to good condition with cracked and scaled areas.

Entrance Area
Left wingwall or retaining wall had a large hole in it and was deeply scaled along the bottom half. Part of the old mill foundation on left has slid down and the top could fall at any time.



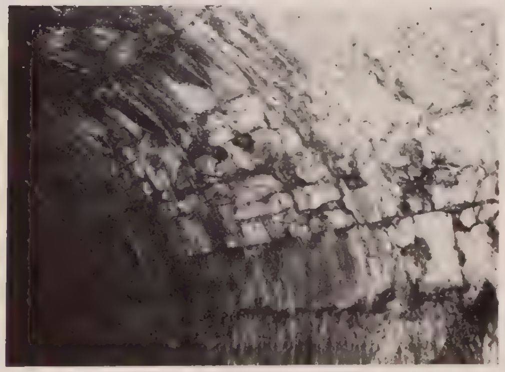
Joint Area Behind Entrance Headwall
Nearly all blocks next to the headwall were cracked and holes up to 1' deep existed all around arch.



Exit
Headwall was in fair condition with a vertical crack over the arch and a number of cracks on the lower section. Both wingwalls were in good condition with only a few scattered cracks.

Looking South From Exit

East Wall Near Exit
Blocks appear to have moved (possibly open joints) and wood timber or pile exposed next to exit headwall.

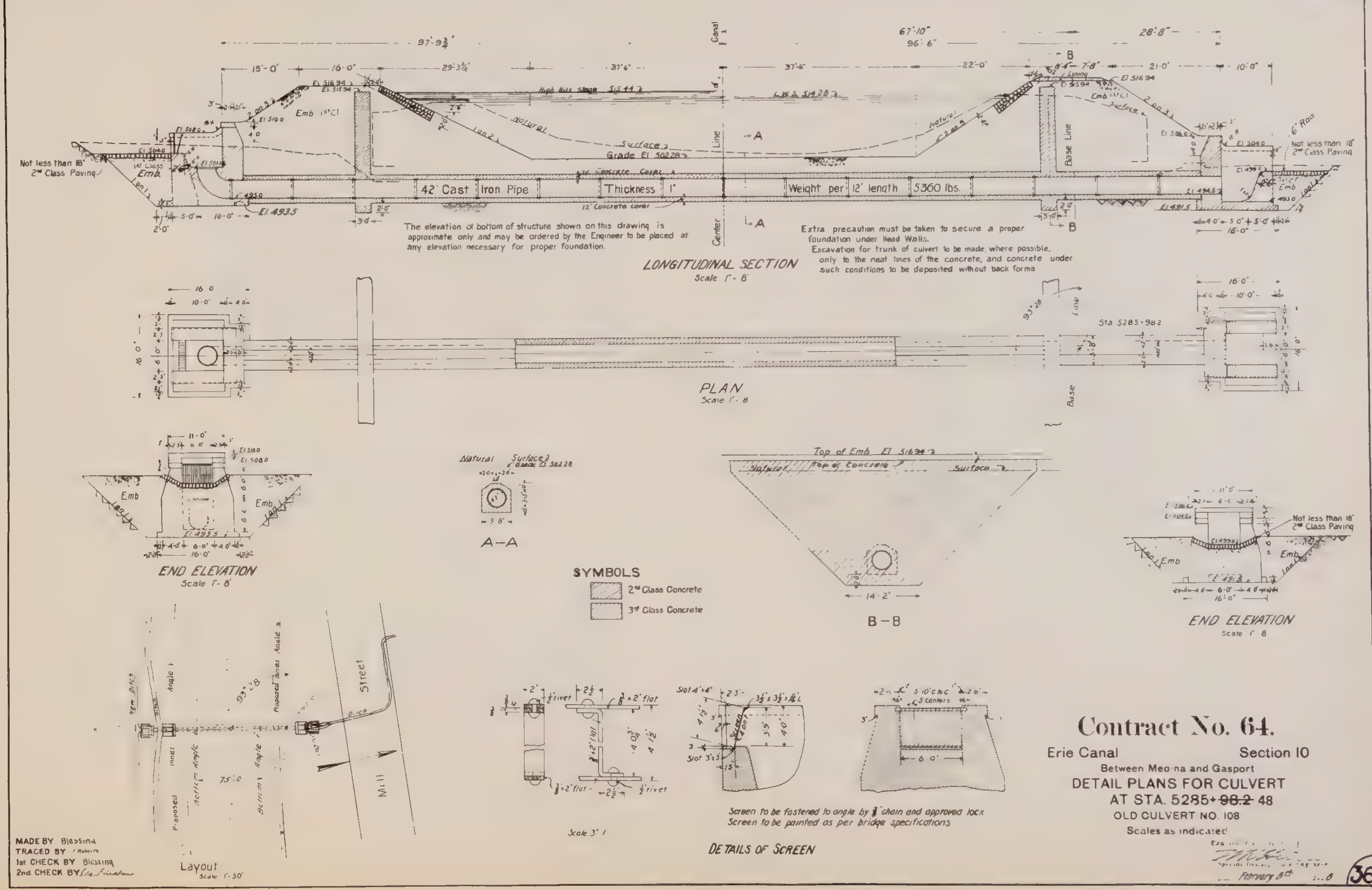


Fractured Stone Blocks
Cracked blocks were seen in a few areas.

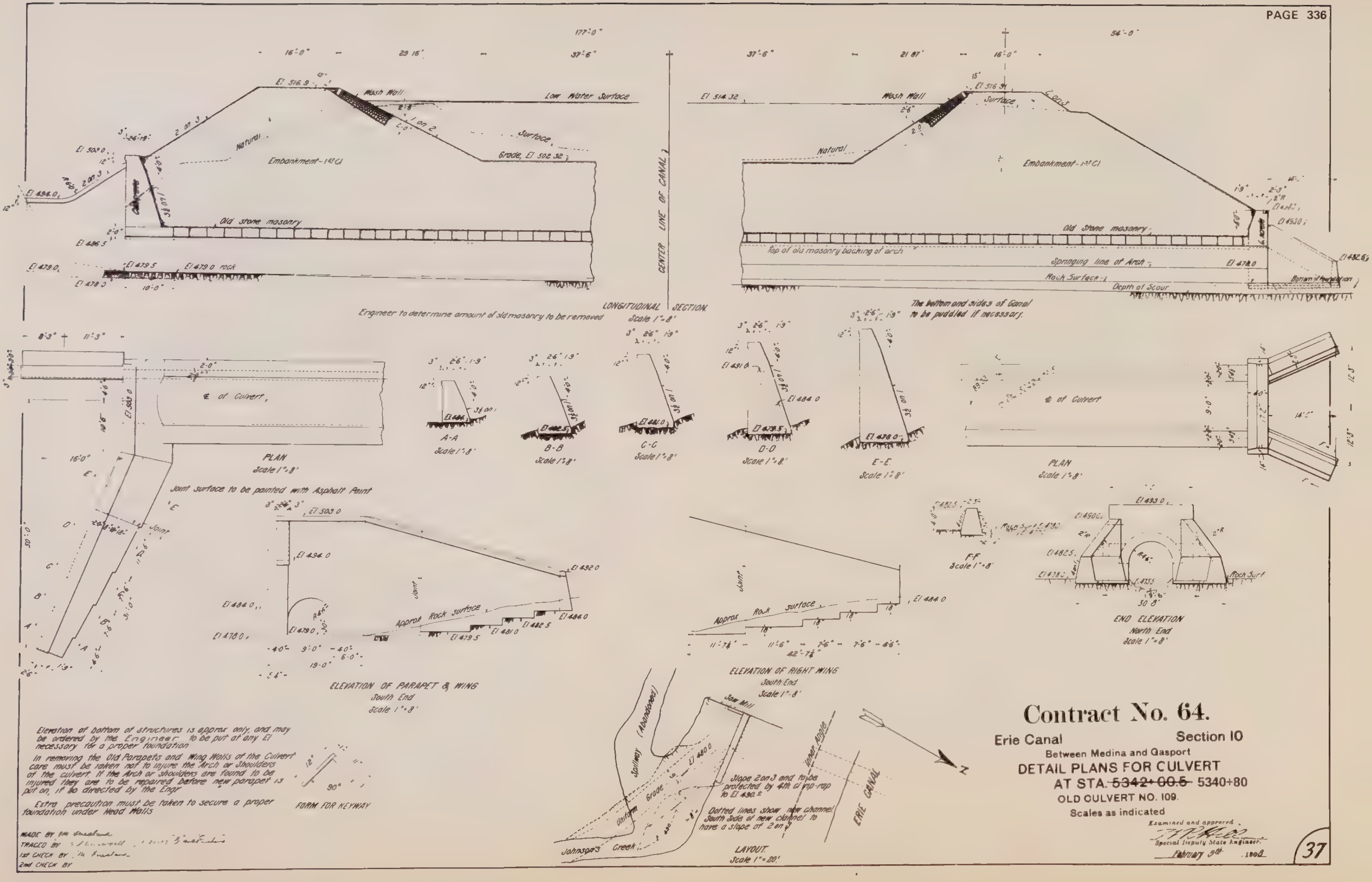
Approximately 6" x 12" Block Missing or Never Placed
Rocks and gravel seen in hole on west wall. Another void was seen on the east wall behind a gap in the wall. Both areas were dry.

The culvert was in generally fair to good condition. 4 drip size streams existed near the south (entrance) end and spotty slow drippage was noted in a few areas, but large areas were dry although stains indicated past leakage or slow seepage. 2 blocks were partially missing up to 4" deep.

Open joints between blocks and the joint area behind the entrance headwall should be repaired. Repairs are also needed on the left wingwall at the entrance and dangerous conditions outside the entrance should be removed.



42" Cast Iron Pipe
Thickness 1"
Weight per 12' length 5360 lbs.
High Max Stage El 515.44
L.W.S. 514.28
Grade El 502.28
Emb 1st Cl
Not less than 18" 2nd Class Paving
The elevation of bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for proper foundation.
Extra precaution must be taken to secure a proper foundation under Head Walls.
Excavation for trunk of culvert to be made, where possible, only to the neat lines of the concrete, and concrete under such conditions to be deposited without back forms
LONGITUDINAL SECTION
Scale 1" = 8'
PLAN
Scale 1" = 8'
Sta 5285+98.2
END ELEVATION
Scale 1" = 8'
A–A
SYMBOLS
2nd Class Concrete
3rd Class Concrete
Top of Emb El 516.94
B–B
END ELEVATION
Scale 1" = 8'
Layout
Scale 1" = 50'
Mill Street
Screen to be fastened to angle by 3/8" chain and approved lock
Screen to be painted as per bridge specifications
Scale 3" = 1'
DETAILS OF SCREEN
Contract No. 64.
Erie Canal
Section 10
Between Medina and Gasport
DETAIL PLANS FOR CULVERT
AT STA. 5285+98.2 48
OLD CULVERT NO. 108
Scales as indicated
MADE BY Blessing
TRACED BY
1st CHECK BY Blessing
2nd CHECK BY
February 8th
36



Wash Wall
Low Water Surface
Natural
Surface
Embankment - 1st Cl
Grade, El 502.32
Old stone masonry
CENTER LINE OF CANAL
Top of old masonry backing of arch
Springing line of Arch
Rock Surface
Depth of Scour
Bottom of foundation
Engineer to determine amount of old masonry to be removed
LONGITUDINAL SECTION
Scale 1" = 8'
The bottom and sides of Canal to be puddled if necessary.
℄ of Culvert
PLAN
Scale 1" = 8'
A-A
Scale 1" = 8'
B-B
Scale 1" = 8'
C-C
Scale 1" = 8'
D-D
Scale 1" = 8'
E-E
Scale 1" = 8'
Joint surface to be painted with Asphalt Paint
Approx Rock surface
ELEVATION OF PARAPET & WING
South End
Scale 1" = 8'
ELEVATION OF RIGHT WING
South End
Scale 1" = 8'
F-F
Scale 1" = 8'
END ELEVATION
North End
Scale 1" = 8'
Elevation of bottom of structures is approx. only, and may be ordered by the Engineer to be put at any El necessary for a proper foundation
In removing the Old Parapets and Wing Walls of the Culvert care must be taken not to injure the Arch or Shoulders of the culvert. If the Arch or shoulders are found to be injured they are to be repaired before new parapet is put on, if so directed by the Engr
Extra precaution must be taken to secure a proper foundation under Head Walls
FORM FOR KEYWAY
Spillway (Abandoned)
Uniform Grade
Johnson's Creek
Slope 2 on 3 and to be protected by 4th cl rip-rap to El 490.2
Dotted lines show new channel. South side of new channel to have a slope of 2 on 3
ERIE CANAL
LAYOUT
Scale 1" = 20'
Contract No. 64.
Erie Canal
Section 10
Between Medina and Gasport
DETAIL PLANS FOR CULVERT
AT STA. 5342+00.5 5340+80
OLD CULVERT NO. 109.
Scales as indicated
Examined and approved
Special Deputy State Engineer.
February 5th 1908
MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY
37

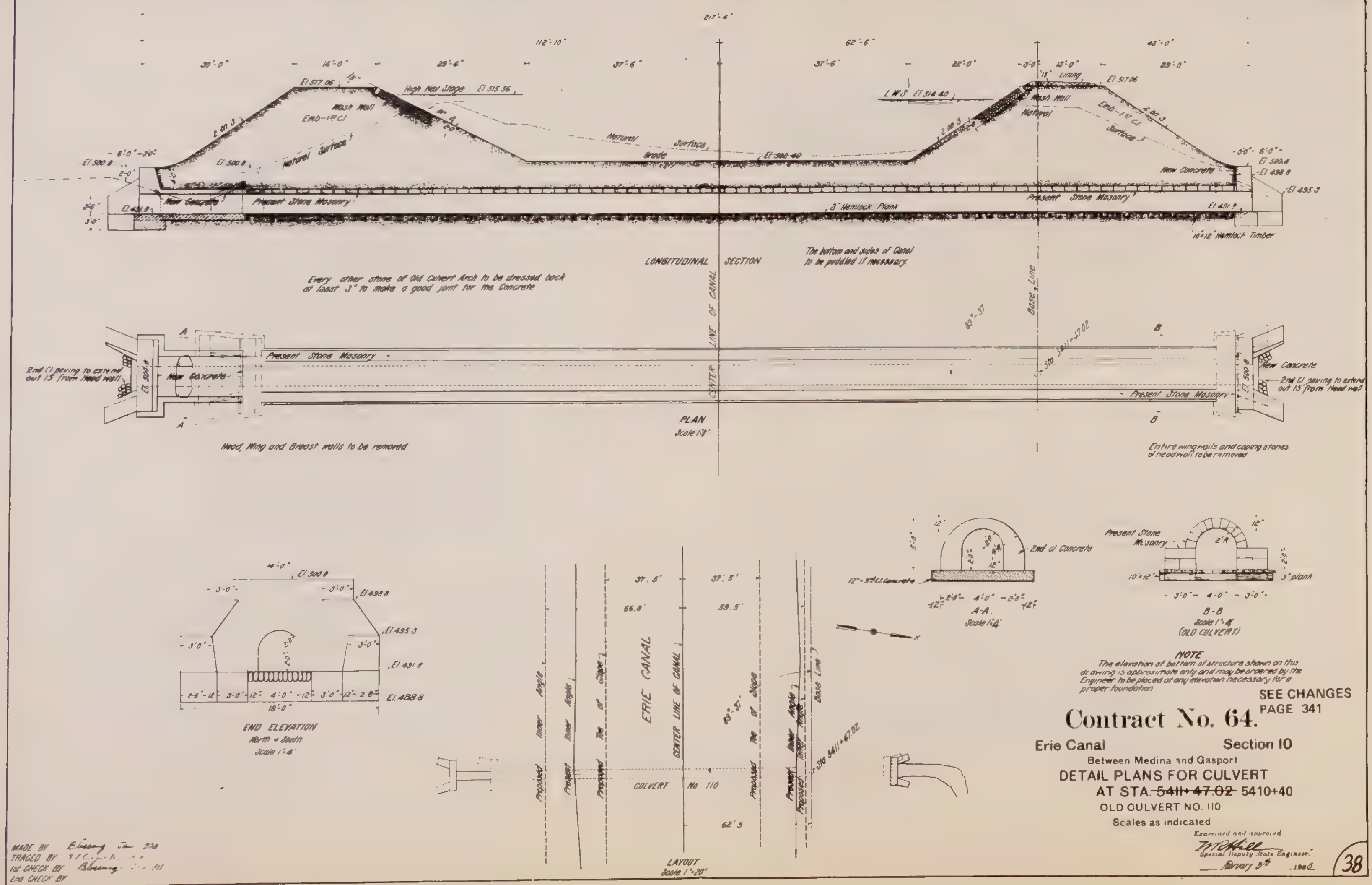
Culvert #110 197' of 48" Cast Iron Pipe
20.5' of 4' X 4' Concrete Arch

Entrance
Headwall appeared in poor condition with many cracks. Wingwalls were in fair condition with fewer cracks.

Exit
Headwall and wingwalls were in poor condition with many cracks and delaminated areas. The whole headwall appeared to have moved as there was a 2" gap between it and the cast iron pipe.

Hole Behind Exit Headwall
Soil has been washing into the culvert through a 2" gap between headwall and pipe. A 1' wide by 6' long hole was behind the headwall and, from inside the culvert, daylight could be seen through gap.

Cast iron pipe was in good condition. Slow seepage through joints and at center drain. Concrete arch at south (entrance) end in good condition. Headwall areas, especially north (exit) end, need repair.



SEE CHANGES PAGE 341

Contract No. 64.

Erie Canal Section 10

Between Medina and Gasport

DETAIL PLANS FOR CULVERT

AT STA. ~~5411+47.02~~ 5410+40

OLD CULVERT NO. 110

Scales as indicated

Examined and approved

Special Deputy State Engineer.

February 5th 1902

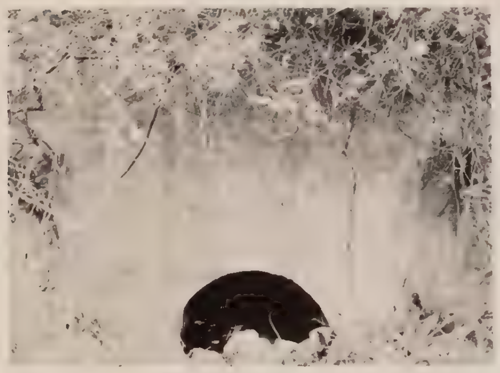
MADE BY

TRACED BY

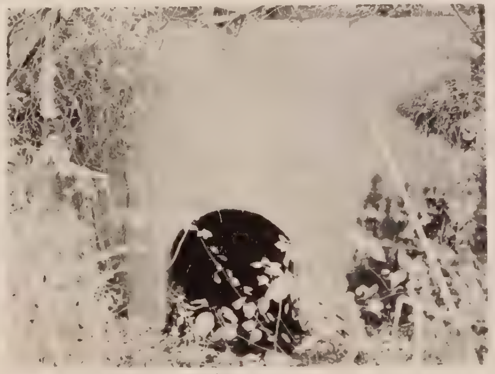
1st CHECK BY

2nd CHECK BY

Culvert #111 188' of 48" Cast Iron Pipe
20.5' of 4' X 4' Concrete Arch



Entrance
Headwall was covered with cracks, scaled at top and delaminated. Wingwalls were deeply scaled along the top.

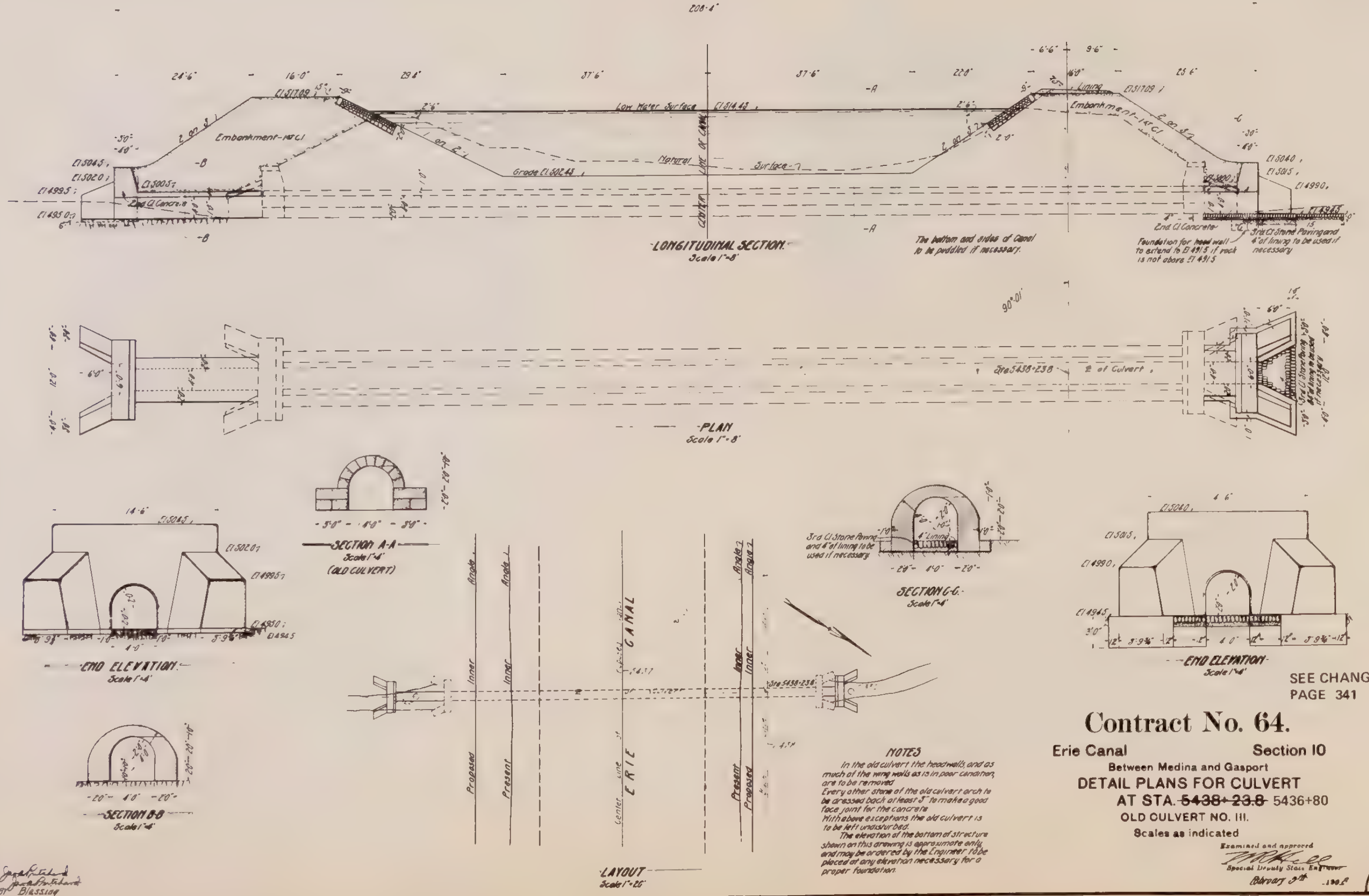


Exit
Headwall and wingwalls had many cracks. Right wingwall was delaminated.

Cast iron pipe and concrete arches at both ends were in good condition. Slow seepage through joints and at center drain.

Culvert #112(Dive) 207.5' of 36" Cast Iron Pipe
Not Inspected

Exit
Top section of headwall and most of wingwalls in good condition. Bottom section of headwall cracked and scaled. Ends of wingwalls cracked, scaled and delaminated.



NOTES

In the old culvert the headwalls, and as much of the wing walls as is in poor condition, are to be removed.
Every other stone of the old culvert arch is to be dressed back at least 3" to make a good face joint for the concrete.
With above exceptions the old culvert is to be left undisturbed.
The elevation of the bottom of structure shown on this drawing is approximate only, and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.

SEE CHANGES
PAGE 341

Contract No. 64.

Erie Canal Section 10

Between Medina and Gasport

DETAIL PLANS FOR CULVERT
AT STA. ~~5438+23.8~~ 5436+80

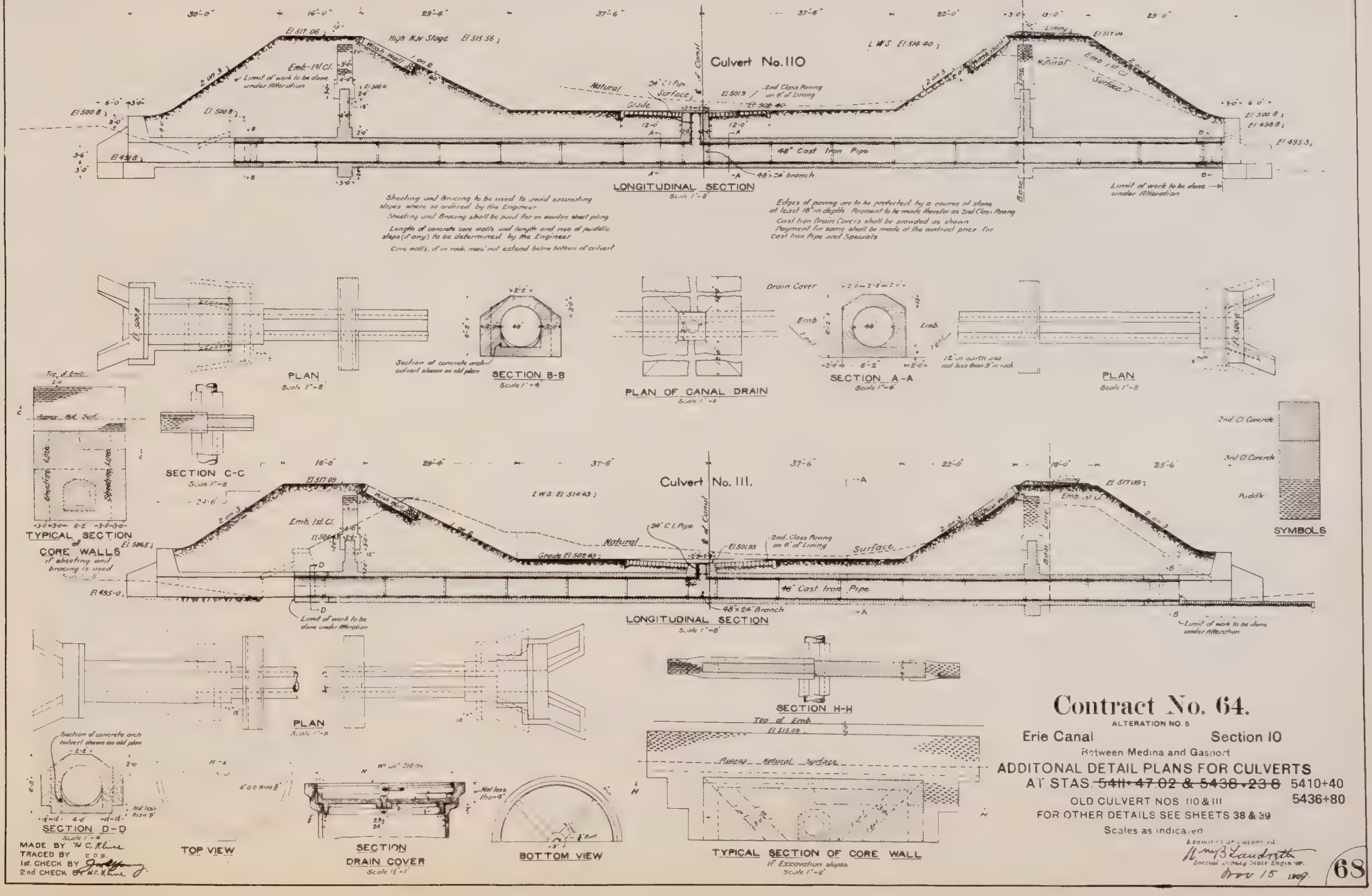
OLD CULVERT NO. III.

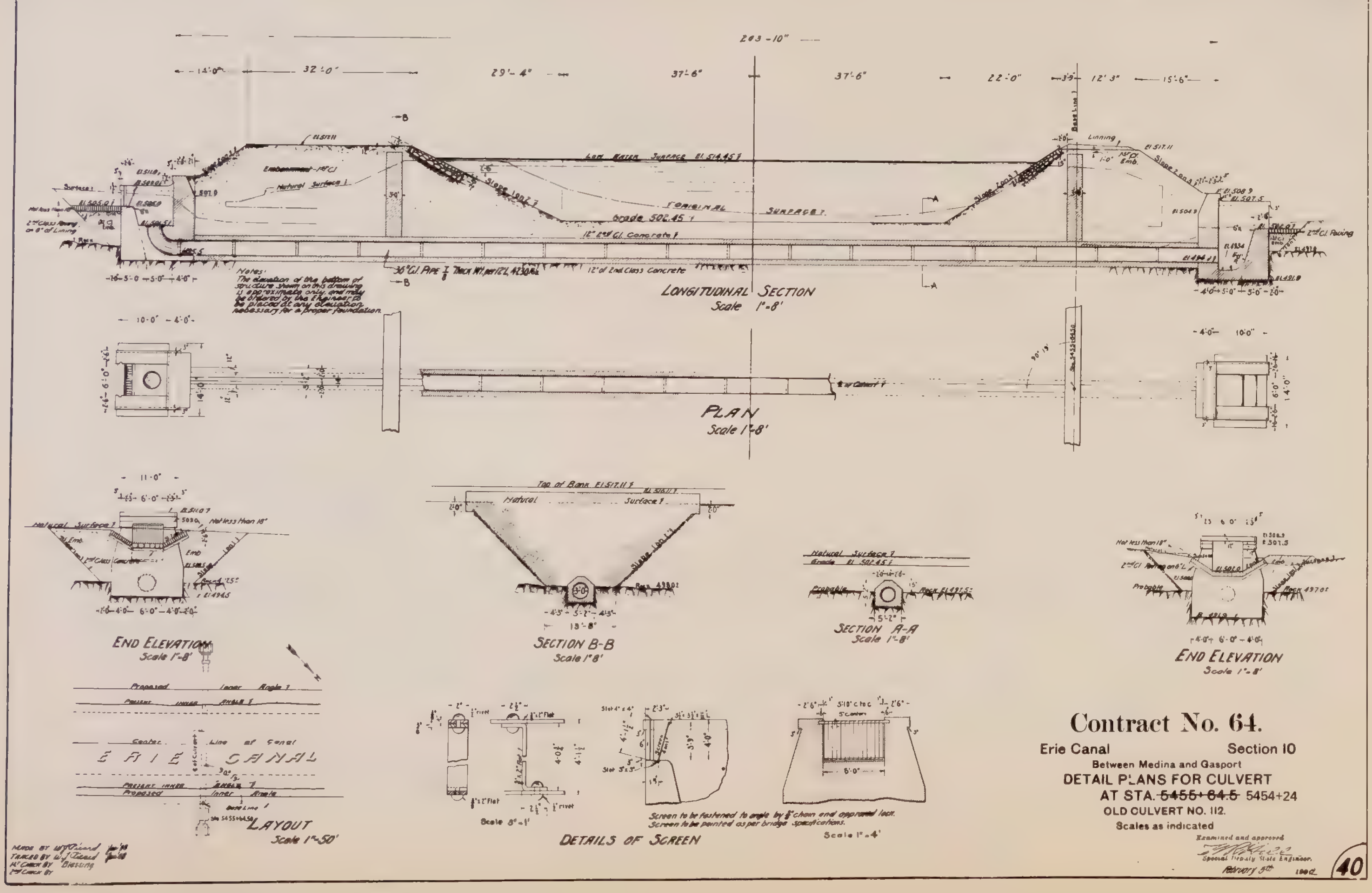
Scales as indicated

Examined and approved
Special Deputy State Engineer
February 9th 1908

MADE BY
TRACED BY
1st CHECK BY Blessing
2nd CHECK BY

39


Culvert No.110
LONGITUDINAL SECTION
48" Cast Iron Pipe
48"x24" branch
Sheeting and Bracing to be used to avoid excavating slopes where so ordered by the Engineer
Sheeting and Bracing shall be paid for as wooden sheet piling
Length of concrete core walls and length and rise of puddle steps (if any) to be determined by the Engineer
Core walls, if in rock, need not extend below bottom of culvert
Edges of paving are to be protected by a course of stone at least 18" in depth. Payment to be made therefor as 2nd Class Paving
Cast Iron Drain Covers shall be provided as shown
Payment for same shall be made at the contract price for Cast Iron Pipe and Specials
PLAN
SECTION B-B
PLAN OF CANAL DRAIN
SECTION A-A
SECTION C-C
TYPICAL SECTION of CORE WALLS if sheeting and bracing is used
Culvert No. 111.
SYMBOLS
2nd Cl Concrete
3rd Cl Concrete
Puddle
SECTION H-H
SECTION D-D
TOP VIEW
SECTION DRAIN COVER
BOTTOM VIEW
TYPICAL SECTION OF CORE WALL if Excavation slopes
Contract No. 64.
ALTERATION NO. 5
Erie Canal
Section 10
Between Medina and Gasport
ADDITONAL DETAIL PLANS FOR CULVERTS
AT STAS. 5411+47.02 & 5438+23.8 5410+40
OLD CULVERT NOS 110 & 111 5436+80
FOR OTHER DETAILS SEE SHEETS 38 & 39
Scales as indicated
MADE BY H. C. Kline
TRACED BY C.O.B.
1st CHECK BY
2nd CHECK BY H.C. Kline
68

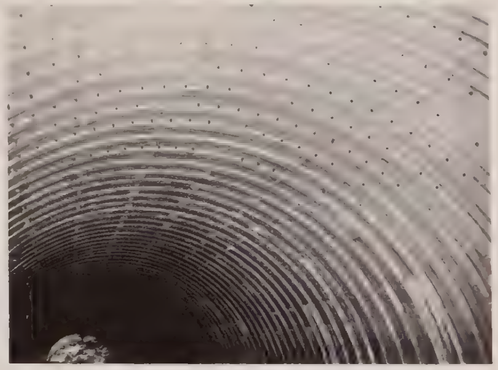


LONGITUDINAL SECTION
Scale 1"=8'
Low Water Surface
Embankment - 1st Cl.
Natural Surface
Original Surface
Grade 502.45
12" 2nd Cl. Concrete
12" of 2nd Class Concrete
Notes:
The elevation of the bottom of structure shown on this drawing is approximate only, and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.
PLAN
Scale 1"=8'
END ELEVATION
Scale 1"=8'
SECTION B-B
Scale 1"=8'
Top of Bank El. 517.11
SECTION A-A
Scale 1"=8'
END ELEVATION
Scale 1"=8'
Proposed Inner Angle
Present Inner Angle
Center Line of Canal
ERIE CANAL
LAYOUT
Scale 1"=50'
DETAILS OF SCREEN
Screen to be fastened to angle by 3/8" chain and approved lock.
Screen to be painted as per bridge specifications.
Scale 1"=4'
Contract No. 64.
Erie Canal
Section 10
Between Medina and Gasport
DETAIL PLANS FOR CULVERT
AT STA. 5455+64.5 5454+24
OLD CULVERT NO. 112.
Scales as indicated
Examined and approved
Special Deputy State Engineer.
40

Culvert #113 190' of 18' Wide X 10' High Stone Block Arch and 30' of Concrete Arch
(In 1967, this culvert was lined with corrugated metal under Contract M67-9)

Entrance
Headwall generally in good condition. A few efflorescent covered cracks and delaminated around the edge of the arch. Wingwalls in fair to good condition with areas of efflorescent covered cracks.

Exit
Headwall and wingwalls generally in good condition. Lower end of right wingwall extensively cracked and sounds delaminated. Culvert rests on bedrock.

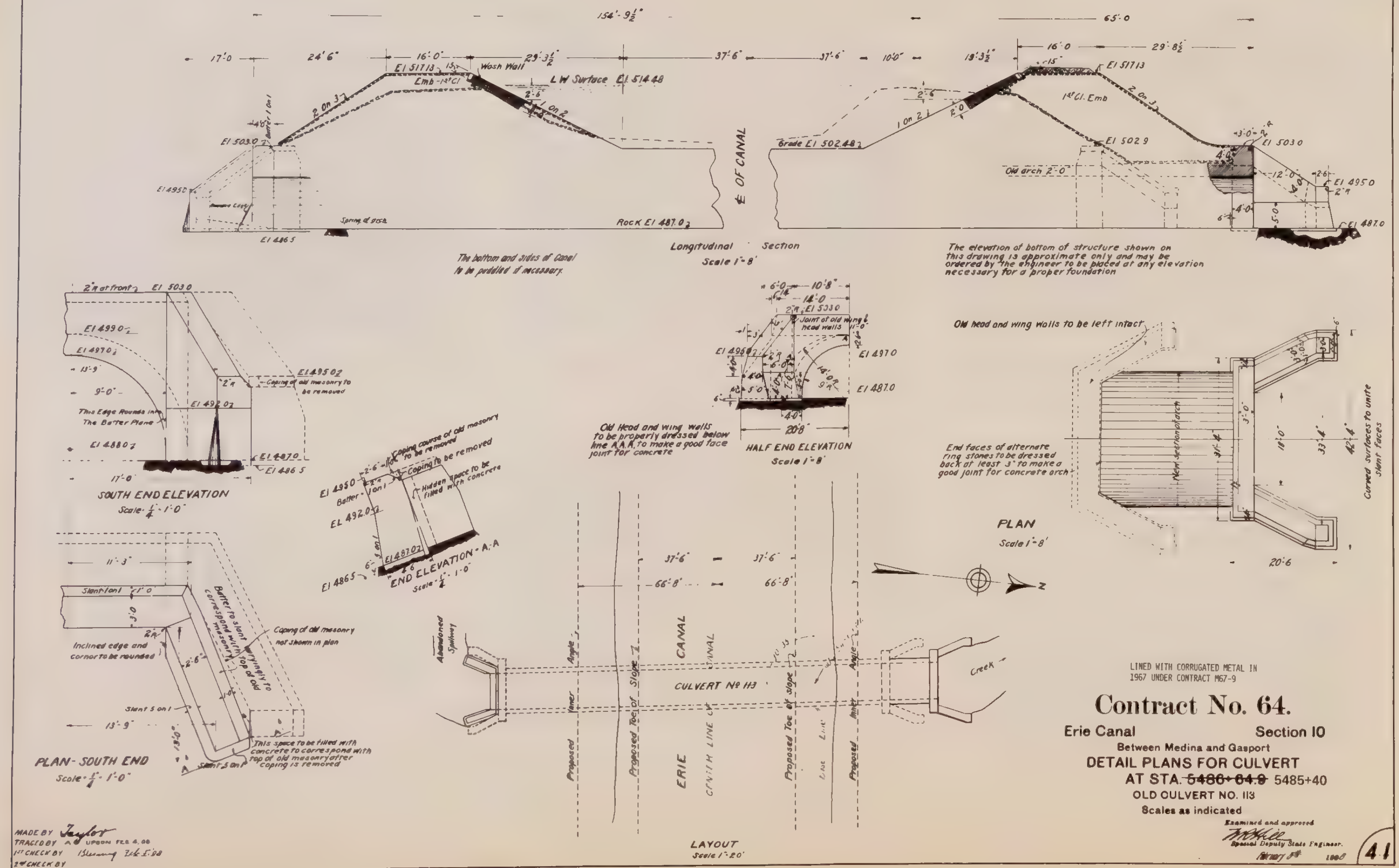


South End - Looking North
From the entrance to about 15-20' in, the bolts used to hold the plates side by side have rusted. All other bolts were not rusted.

Looking North From Near Center of Culvert
Most of the staining and drippage was concentrated from the middle of the culvert to more than halfway to the exit. A concrete encased utility line runs along the west side of the barrel.

Abandoned Trailer Truck Body
This truck body was very dangerously perched on the side of the stream bank and ready to slide down. Even if it is not on state land, it should be removed.

The steel liner plates looked in good condition. There was drippage and strains throughout the length of the culvert, but most wet areas, stains and drippage were concentrated from the middle to more than halfway to the exit. Mortar stains around the numerous plugs in the liner plate indicate that grout was placed behind the liner. However, the grout has not been 100% effective in stopping leaks.



LINED WITH CORRUGATED METAL IN
1967 UNDER CONTRACT M67-9

Contract No. 64.

Erie Canal — Section 10

Between Medina and Gasport

DETAIL PLANS FOR CULVERT

AT STA. ~~5486+64.9~~ 5485+40

OLD CULVERT NO. 113

Scales as indicated

Examined and approved

Special Deputy State Engineer.

Culvert #114 (Dive) 185.5' of 30" Cast Iron Pipe
Not Inspected

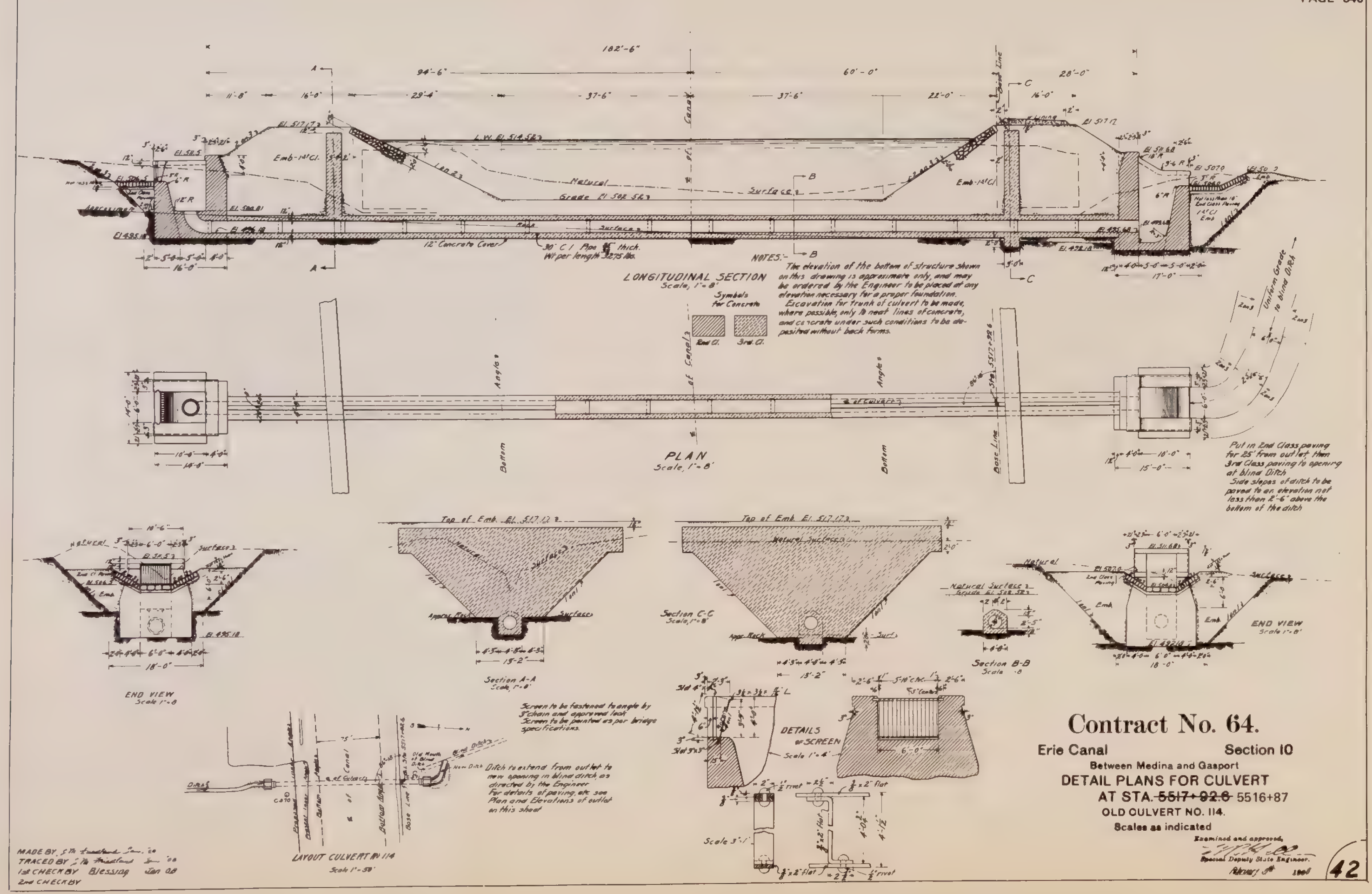
Exit
Headwall and wingwalls in good condition. A few cracks on left wingwall. Sewer

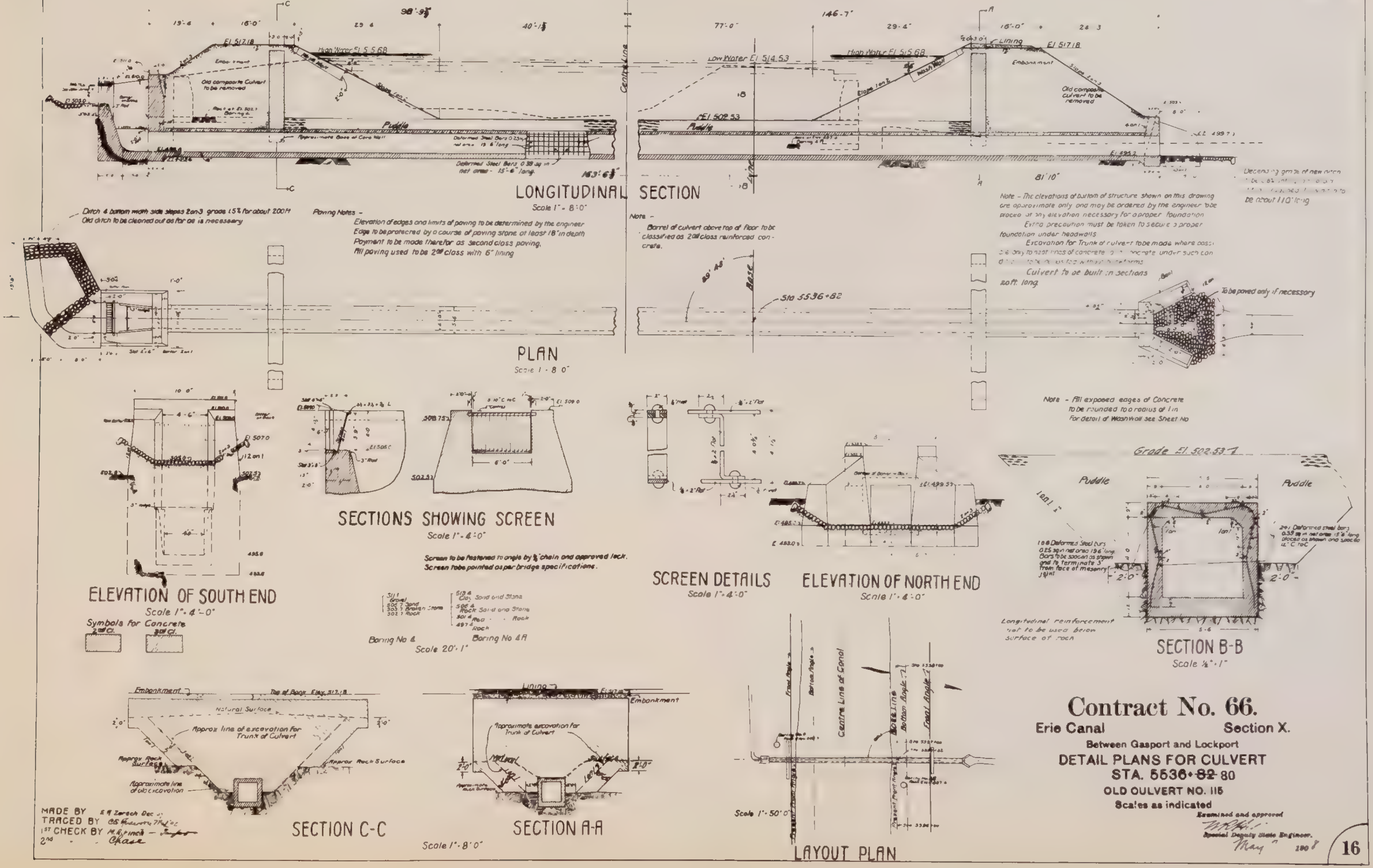
Culvert #115 245.5' of 4' X 4' Concrete Box

Exit
Headwall and wingwalls in good condition. Abandoned 3" gas pipe attached to east wall.

Entrance
At entrance end of culvert is a 6' square, 8' high concrete well. A 30" corrugated metal pipe and a metal grate, located in a shelf area on the south side of the well, allow water in. The water then cascades down the south wall. A concrete slab covered the well and there was a 6" gap between this slab and the slab holding the metal grate. The gas pipe went straight up the north wall of the well and out through the slab. All concrete inside the well was in good condition.

The concrete culvert was in good condition. Slow seepage through most of the joints.


LONGITUDINAL SECTION
Scale, 1" = 8'
NOTES:-
The elevation of the bottom of structure shown on this drawing is approximate only, and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation.
Excavation for trunk of culvert to be made, where possible, only to neat lines of concrete, and concrete under such conditions to be deposited without back forms.
Symbols for Concrete
2nd Cl.
3rd Cl.
12" Concrete Cover
30" C I Pipe thick.
PLAN
Scale, 1" = 8'
Put in 2nd Class paving for 25' from outlet, then 3rd Class paving to opening at blind Ditch.
Side slopes of ditch to be paved to an elevation not less than 2'-6" above the bottom of the ditch
Uniform Grade to blind Ditch
END VIEW
Scale 1" = 8'
Section A-A
Scale, 1" = 8'
Section C-C
Scale, 1" = 8'
Section B-B
Top of Emb. El. 517.17
Screen to be fastened to angle by 3/8" chain and approved lock.
Screen to be painted as per bridge specifications.
DETAILS of SCREEN
Scale 1" = 4'
Ditch to extend from outlet to new opening in blind ditch, as directed by the Engineer.
For details of paving, etc. see Plan and Elevations of outlet on this sheet
LAYOUT CULVERT No 114
Scale 1" = 50'
Scale 3" = 1'
Contract No. 64.
Erie Canal
Section 10
Between Medina and Gasport
DETAIL PLANS FOR CULVERT
AT STA. ~~5517+92.6~~ 5516+87
OLD CULVERT NO. 114.
Scales as indicated
Examined and approved,
Special Deputy State Engineer.
MADE BY
TRACED BY
1st CHECK BY Blessing Jan 08
2nd CHECK BY
42


LONGITUDINAL SECTION
Scale 1" - 8'-0"
High Water El 515.68
Low Water El 514.53
El 517.18
Embankment
Old composite Culvert to be removed
Puddle
Centre Line
Ditch & bottom width side slopes 2 on 3 grade 1.5% for about 200 ft
Old ditch to be cleaned out as far as is necessary
Paving Notes -
Elevation of edges and limits of paving to be determined by the engineer
Edge to be protected by a course of paving stone at least 18" in depth
Payment to be made therefor as second class paving.
All paving used to be 2nd class with 6" lining
Note -
Barrel of culvert above top of floor to be classified as 2nd class reinforced concrete.
Sta 5536+82
Culvert to be built in sections 20 ft. long
To be paved only if necessary
PLAN
Scale 1" - 8'-0"
Note - All exposed edges of Concrete to be rounded to a radius of 1 in
For detail of Wash Wall see Sheet No
ELEVATION OF SOUTH END
Scale 1" - 4'-0"
Symbols for Concrete
2nd Cl.
3rd Cl.
SECTIONS SHOWING SCREEN
Scale 1" - 4'-0"
Screen to be fastened to angle by 3/8" chain and approved lock.
Screen to be pointed as per bridge specifications.
Boring No 4
Boring No 4A
Scale 20' - 1"
SCREEN DETAILS
Scale 1" - 4'-0"
ELEVATION OF NORTH END
Scale 1" - 4'-0"
Grade El. 502.53
Puddle
SECTION B-B
Scale 1/2" - 1'
Longitudinal reinforcement not to be used below surface of rock
Embankment
Top of Bank Elev. 517.18
Natural Surface
Approx line of excavation for Trunk of Culvert
Approx Rock Surface
Approximate line of old excavation
SECTION C-C
Lining
Approximate excavation for Trunk of Culvert
SECTION A-A
Scale 1" - 8'-0"
Centre Line of Canal
Scale 1" - 50'-0"
LAYOUT PLAN
Contract No. 66.
Erie Canal
Section X.
Between Gasport and Lockport
DETAIL PLANS FOR CULVERT
STA. 5536+82 80
OLD CULVERT NO. 115
Scales as indicated
Examined and approved
Special Deputy State Engineer.
1908
16
MADE BY
TRACED BY
1ST CHECK BY
2nd

Culvert #115½ 231.5' of 24" Cast Iron Pipe

Exit

Headwall in good condition.

Cast iron pipe in good condition. After crawling through, the entrance was grated over and could not get out to inspect headwall. Crawled out pipe backwards.

Cleanup in canal after inspecting culvert.

Culvert #116 (Dive)
191' of 4' Wide X 3' High Concrete Arch
Not Inspected

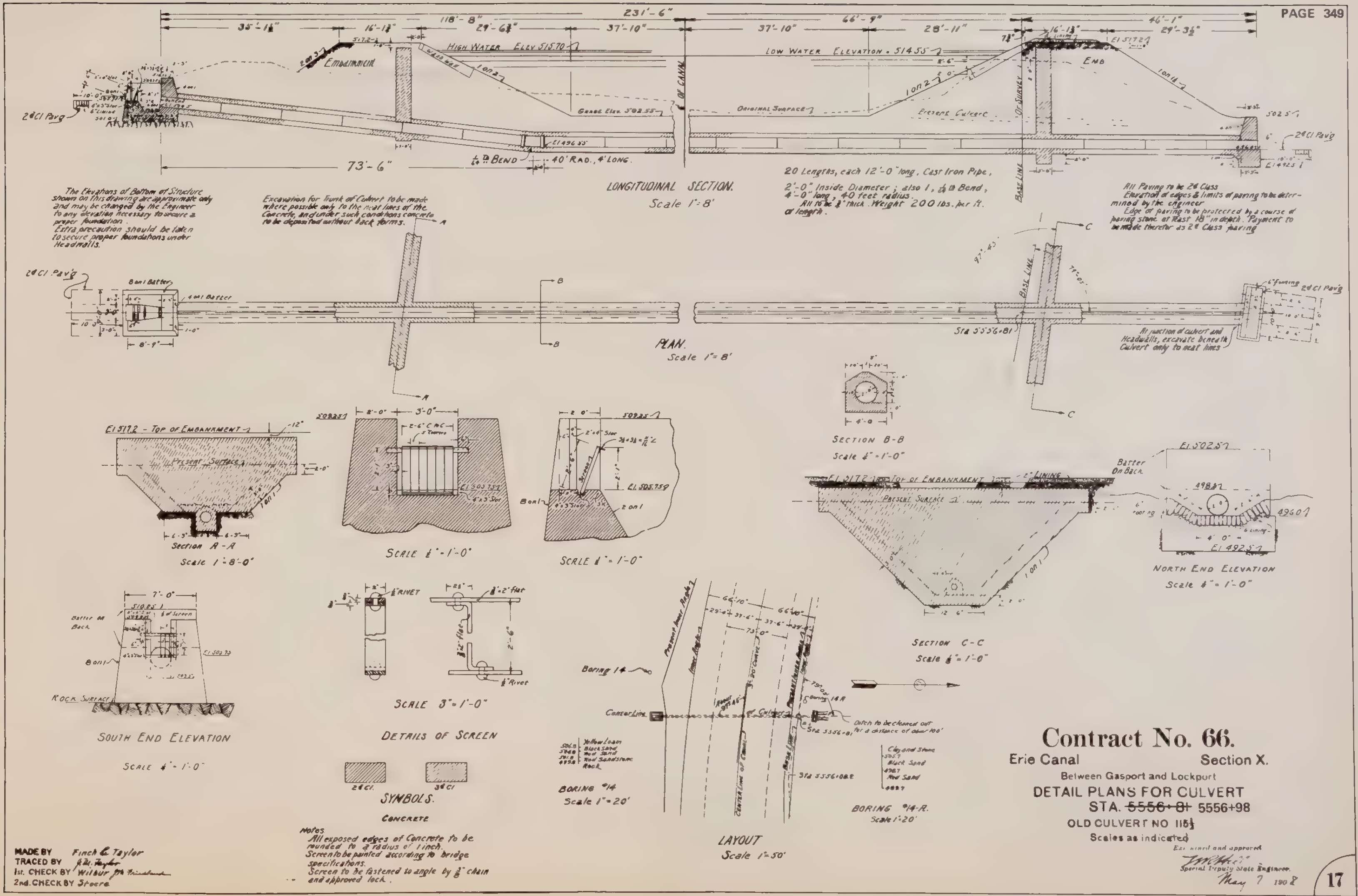
Exit

Headwall and wingwalls in good condition.
2 syphons - 2" inactive, 6" active.

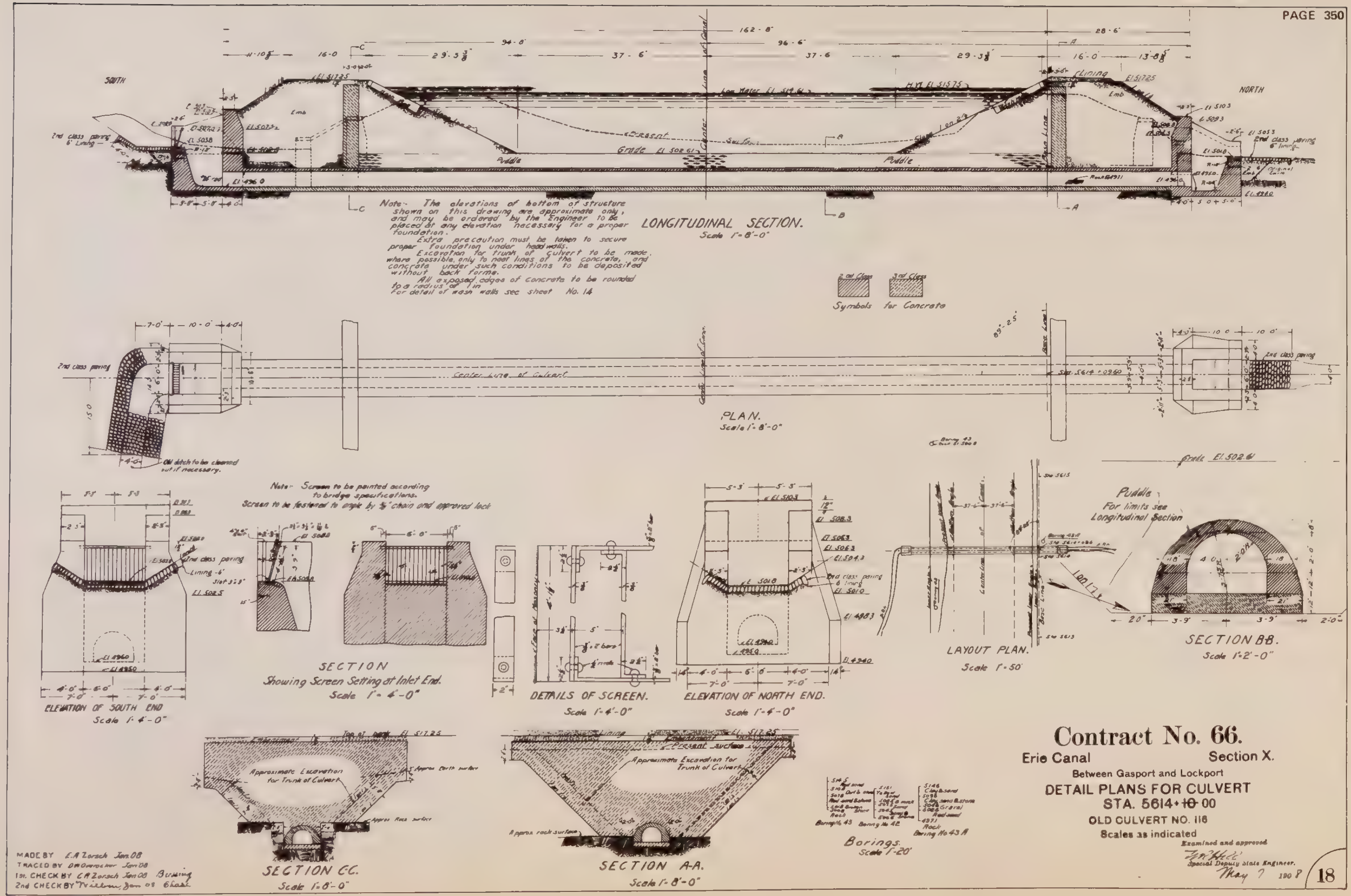
Culvert #117 (Dive)
208.5' of 4' Wide X 3' High Concrete Arch
Not Inspected

Exit

Headwall and wingwalls in good condition.
A few cracks at near end of right wingwall.



231'-6"
35'-1½"
16'-1½"
118'-8"
29'-6¾"
37'-10"
37'-10"
66'-9"
28'-11"
46'-1"
16'-1½"
29'-3½"
High Water Elev 515.70
Low Water Elevation 514.55
Embankment
End
1 on 2
1 on 2
1 on 1½
Grade Elev. 502.55
Original Surface
Present Culvert
2d Cl Pav'g
2d Cl Pav'g
El 496.55
73'-6"
1/16 th Bend
40' Rad., 4' Long.
LONGITUDINAL SECTION.
Scale 1"=8'
20 Lengths, each 12'-0" long, Cast Iron Pipe, 2'-0" Inside Diameter; also 1, 1/16 th Bend, 4'-0" long, 40 feet radius. All to be ¾" thick. Weight 200 lbs. per ft. of length.
All Paving to be 2d Class
Elevation of edges & limits of paving to be determined by the engineer
Edge of paving to be protected by a course of paving stone at least 18" in depth. Payment to be made therefor as 2d Class paving
The Elevations of Bottom of Structure shown on this drawing are approximate only and may be changed by the Engineer to any elevation necessary to secure a proper foundation.
Extra precaution should be taken to secure proper foundations under Headwalls.
Excavation for Trunk of Culvert to be made where possible only to the neat lines of the Concrete, and under such conditions concrete to be deposited without back forms.
PLAN.
Scale 1"=8'
Sta 5556+81
At junction of culvert and Headwalls, excavate beneath Culvert only to neat lines
SECTION B-B
Scale ½"=1'-0"
El 517.2 - Top of Embankment
Present Surface
1 on 1
Section A-A
Scale 1"=8'-0"
Scale ½"=1'-0"
Scale ½"=1'-0"
El 517.2 Top of Embankment
Present Surface
Section C-C
Scale ⅛"=1'-0"
El 502.5
Batter On Back
El 492.5
North End Elevation
Scale ¼"=1'-0"
7'-0"
Rock Surface
South End Elevation
Scale ¼"=1'-0"
¼" Rivet
Scale 3"=1'-0"
Details of Screen
2d Cl.
3d Cl
SYMBOLS.
Concrete
Boring #14
Scale 1"=20'
Center Line
Ditch to be cleaned out for a distance of about 100'
Sta 5556+81
Boring #14-R.
Scale 1"=20'
LAYOUT
Scale 1"=50'
Notes
All exposed edges of Concrete to be rounded to a radius of 1 inch.
Screen to be painted according to bridge specifications.
Screen to be fastened to angle by ⅜" chain and approved lock.
MADE BY Finch & Taylor
TRACED BY
1st. CHECK BY Wilbur
2nd. CHECK BY Steere
Contract No. 66.
Erie Canal
Section X.
Between Gasport and Lockport
DETAIL PLANS FOR CULVERT
STA. ~~5556+81~~ 5556+98
OLD CULVERT NO 115½
Scales as indicated
Special Deputy State Engineer.
May 7 1908
17



Contract No. 66.

Erie Canal — Section X.

Between Gasport and Lockport

DETAIL PLANS FOR CULVERT

STA. 5614+~~10~~ 00

OLD CULVERT NO. 118

Scales as indicated

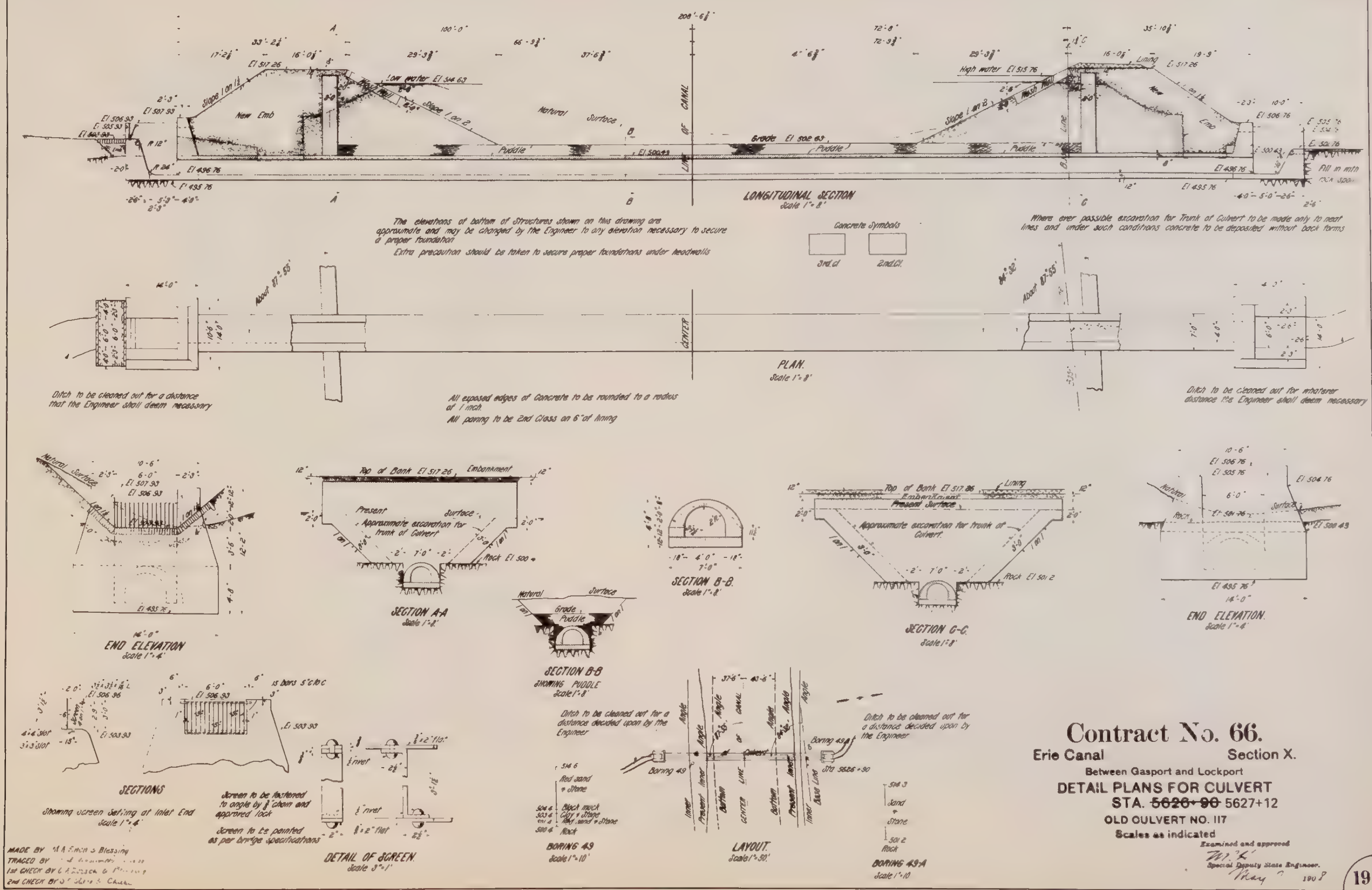
Examined and approved

Special Deputy State Engineer.

May 7 1908

MADE BY E.A. Zorsch Jan. 08
TRACED BY D.M. Overocker Jan. 08
1st. CHECK BY C.A. Zorsch Jan. 08
2nd CHECK BY Willum, Jan. 08

18



Contract No. 66.

Erie Canal — Section X.

Between Gasport and Lockport

DETAIL PLANS FOR CULVERT

STA. ~~5626+90~~ 5627+12

OLD CULVERT NO. 117

Scales as indicated

Examined and approved

Special Deputy State Engineer.

1908

Culvert #118 203' of 6' Wide X 5' High Stone Block Arch and
30' of Concrete Arch

Entrance
Headwall in good condition. Both wingwalls were deeply scaled along the bottom 2'.

Exit
Headwall and both wingwalls were deeply scaled and delaminated. Left wingwall was completely undermined just above water level and right wingwall partially undermined. Large hole in embankment behind headwall.

Typical Interior of Stone Block Arch

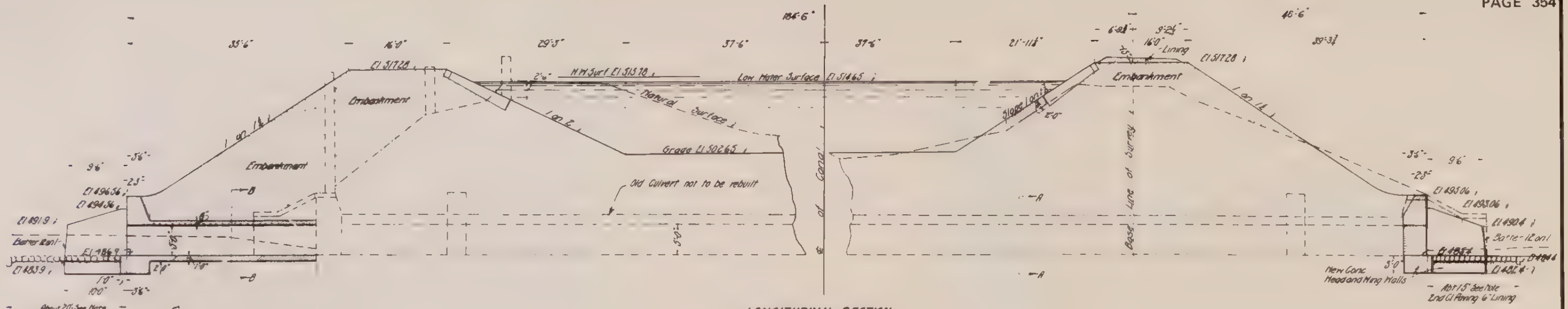
Looking Out North End or Exit
Note missing stone blocks or concrete behind headwall. Staggered blocks may mean that only concrete has fallen out.

Right Side of Arch Behind Exit Headwall
Embankment was washing into culvert where stone blocks or concrete had disappeared.

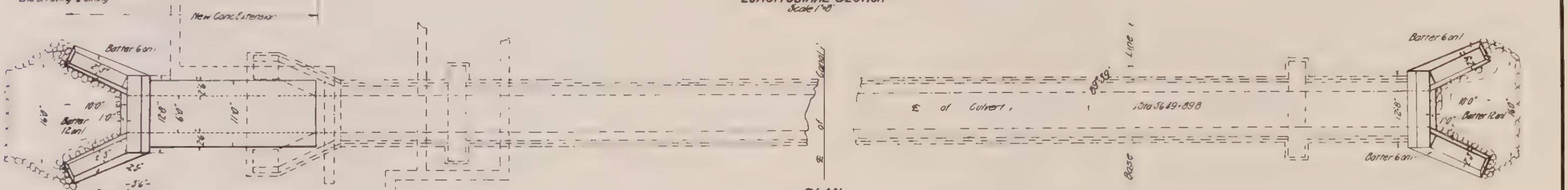
Hole Behind Headwall
A 10' diameter 4-5' deep hole existed behind the exit headwall. Headwall is hidden by brush near far end of inactive 3" syphon.

Embankment washing in through hole behind exit headwall. Spotty dripping throughout stone block arch. 4-5" deep scaling in concrete around center drain. South end of stone block arch (1st 40' next to concrete arch) contained nearly all the leakage. There were 4 constant drip streams and constant drips, and a ½" diameter stream coming through the joint between the 2 arch sections. Concrete arch at south end was in good condition.

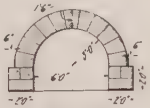
Most of the culvert was in good condition, but the exit headwall area needs to be rebuilt and the leaks at the south end should be stopped.



LONGITUDINAL SECTION
Scale 1"=8'

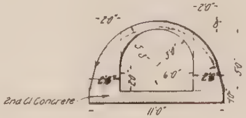


PLAN
Scale 1"=8'

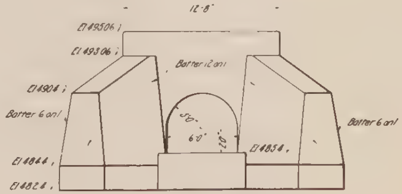


Section through old culvert
SECTION A-A
Scale 1"=4'

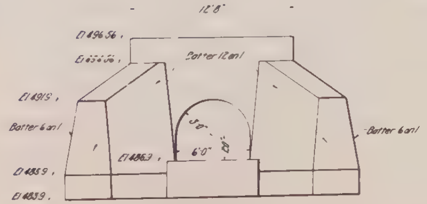
LAYOUT
Scale 1"=50'



SECTION B-B
Scale 1"=4'



END ELEVATION-NORTH
Scale 1"=8'



END ELEVATION - SOUTH
Scale 1"=8'

NOTES

All exposed edges of concrete to be rounded to a radius of 1"

Extra precaution is to be taken to secure a good foundation under headwalls, and a good bond is to be made between the old and new work.

The elevation of bottom of structure shown on this drawing is approximate only and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation

On the south side only so much of the old head and wing walls is to be removed as is necessary.

On the north side the old head and and wing walls are to be removed entire

Elevation of edges and limits of paving to be determined by the Engineer

Edge of paving to be protected by a course of paving stone at least 18" in depth. Payment to be made therefor as 2nd Cl Paving

All paving shown on this sheet to be 2nd Class, with 6" of Lining

Contract No. 66.

Erie Canal Section X.

Between Gasport and Lockport

DETAIL PLANS FOR CULVERT

STA. ~~5649+90~~ 5650+03

OLD CULVERT NO. 118

Scales as indicated

Examined and approved
[signature]
Special Deputy State Engineer.
May 7 1908

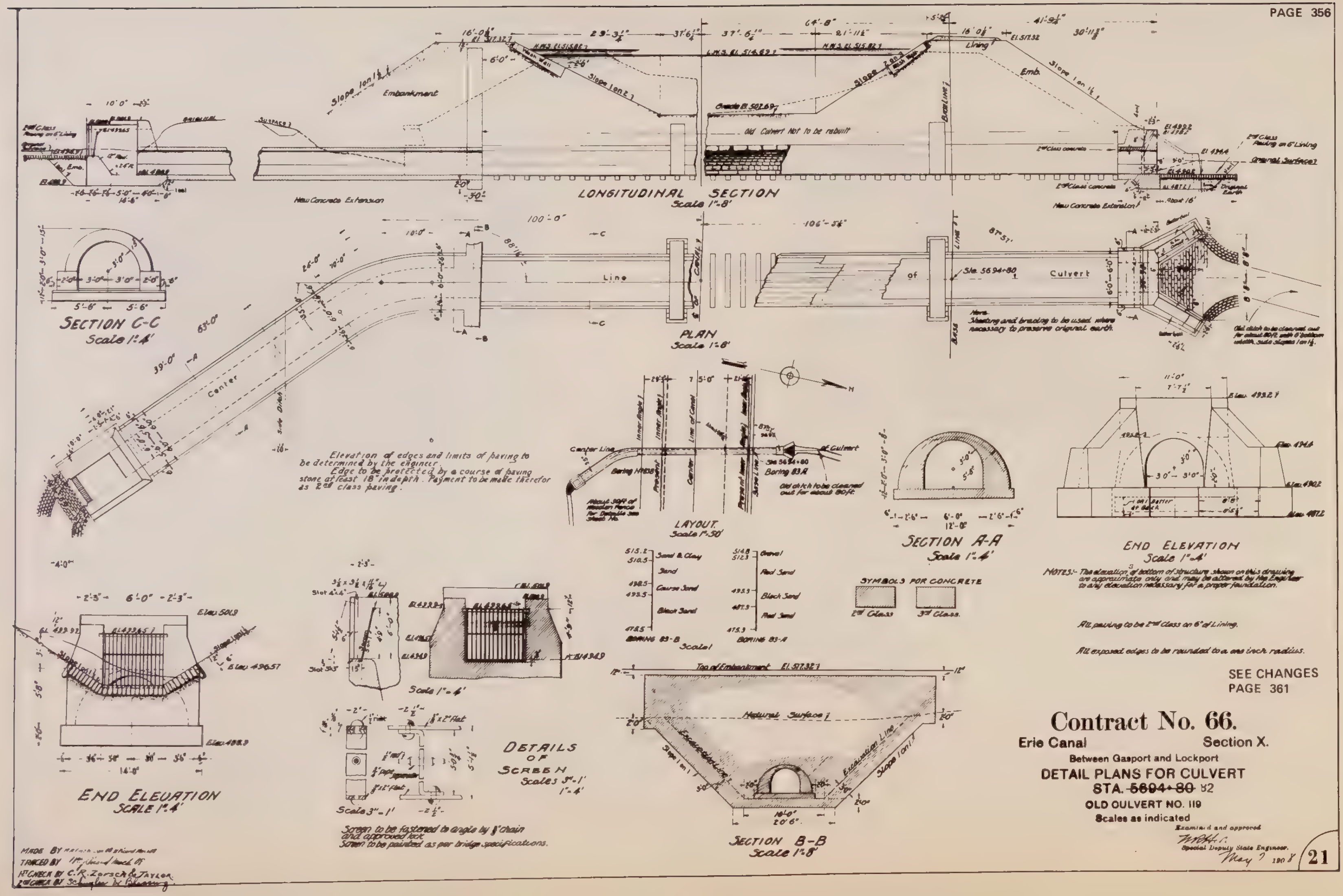
MADE BY C.R. Zorsch
TRACED BY
1st CHECK BY C.R. Zorsch & Blessing
2nd CHECK BY E. Chase

Culvert #119 159' of Twin 48" Cast Iron Pipe
110' of 6' Wide X 5' High Concrete Arch

Entrance
Headwall in good condition with a few scattered cracks. Both wingwalls had many cracks on their end sections, and efflorescent covered cracks on the bottom 3'.

Exit
Headwall and wingwalls were in good condition.

At the south end (entrance), a 90' long concrete arch bends and goes under road. The arch was in good condition, but a few joints were dripping. Leakage was heaviest at junction of twin cast iron pipes. 24" diameter drains at midpoint of both pipes drip slowly. Very little leakage through joints in both cast iron pipes. West barrel was clean, east barrel was half full of dry silt. North end (exit) concrete arch was 20' long (plans show only a 5' long section). Concrete arch in good condition, except for leak through midpoint construction joint. Culvert in good condition, except for a few small leaks.



SEE CHANGES
PAGE 361

Contract No. 66.

Erie Canal — Section X.

Between Gasport and Lockport

DETAIL PLANS FOR CULVERT

STA. ~~5694+80~~ 82

OLD CULVERT NO. 119

Scales as indicated

Examined and approved

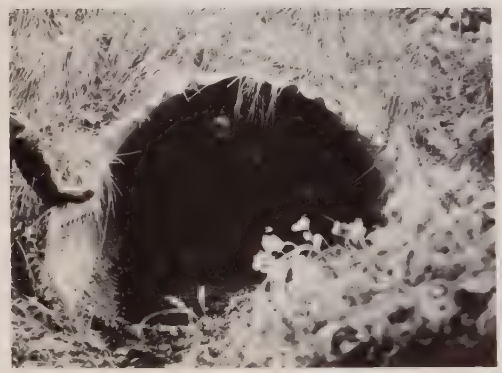
Special Deputy State Engineer.

May 7 1908

Culvert #120 300'± of Various Pipe Sections

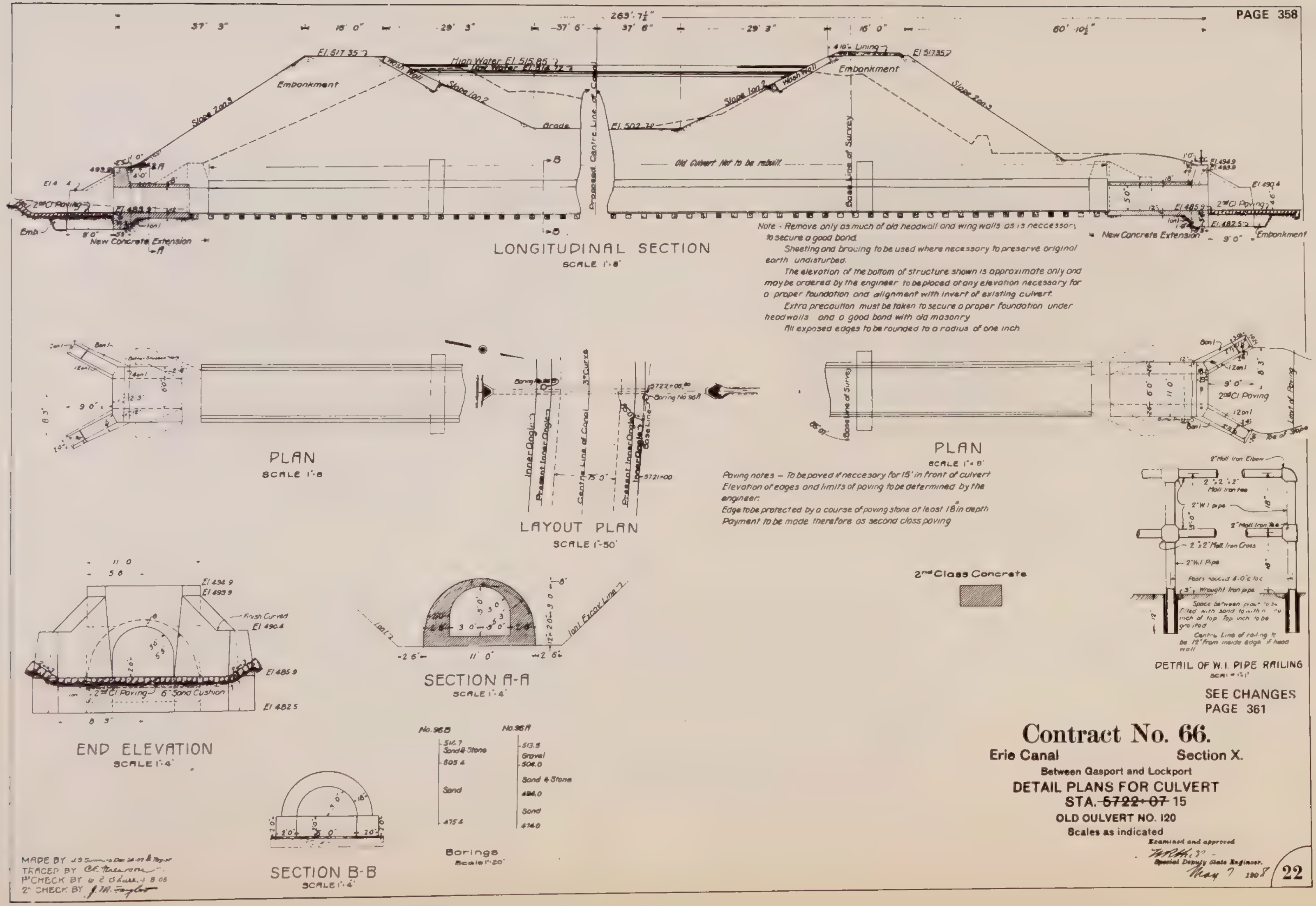
228.5' of 6' Wide X 5' High Stone Block Arch
35' of Concrete Arch
12'± of Concrete Box
25'± of Corrugated Metal Pipe Arch

Entrance
Headwall cracked vertically over top of entrance and scaled along joint, which continued along wingwalls, 3' up from the bottom. Headwall and wingwalls contained many small efflorescent covered cracks. End 2' of left wingwall was ready to fall off.



Exit
Corrugated metal pipe in good condition

From north to south (exit to entrance) - 1st 25' under the road is a new corrugated metal arch that was in good condition. Next 12' is a concrete box that is also under the road and in good condition. Then 30' of concrete arch was in good condition. Overhead grate and flowing underdrains at top of north end of concrete arch. Stone block arch under canal has scattered seepage and 12" center drain. There was 3" deep scaling on stone blocks and small concrete section around drain pipe. Concrete arch at south end was scaled along the joint 3' above the floor and scattered efflorescent covered cracks were on the last 6' of the arch. Culvert generally in good condition.



Note - Remove only as much of old headwall and wing walls as is neccessary to secure a good bond.
Sheeting and bracing to be used where necessary to preserve original earth undisturbed.
The elevation of the bottom of structure shown is approximate only and may be ordered by the engineer to be placed at any elevation necessary for a proper foundation and alignment with invert of existing culvert.
Extra precaution must be taken to secure a proper foundation under headwalls and a good bond with old masonry.
All exposed edges to be rounded to a radius of one inch.

Paving notes – To be paved if neccessary for 15' in front of culvert. Elevation of edges and limits of paving to be determined by the engineer.
Edge to be protected by a course of paving stone at least 18 in depth. Payment to be made therefore as second class paving.

Space between post to be filled with sand to within one inch of top. Top inch to be grouted.
Centre Line of railing to be 12" from inside edge of head wall.

SEE CHANGES PAGE 361

Contract No. 66.

Erie Canal — Section X.

Between Gasport and Lockport

DETAIL PLANS FOR CULVERT

STA. ~~5722+07~~ 15

OLD CULVERT NO. 120

Scales as indicated

Examined and approved
Special Deputy State Engineer.

MADE BY J.S. Summers
TRACED BY
1st CHECK BY
2nd CHECK BY

Culvert #121 165' of 42" Cast Iron Pipe
36' of 4' Wide X 3' High Concrete Arch
29' of 4' Wide X 3' High Concrete Box

Exit

Headwall was deeply scaled, especially around the opening, and partially delaminated.

Entrance

Headwall in good condition except for vertical crack over opening. Wingwalls in good condition except for some efflorescent covered cracks on the end 2'.

Concrete box under roadway and concrete arch under edge of north embankment in good condition. At junction of two sections is an overhead grate and underdrains which drain ditch on south side of road. A 2' square X 3' deep hole was located just east of this grate at the toe of the canal north embankment. Cast iron pipe has slow seepage as most joints, but in good condition. Concrete arch at south end in good condition. Culvert in good condition, but embankment hole should be filled and joint sealed to prevent soil from washing in.

Culvert #122 235' of 4' Wide X 3' High Concrete Box

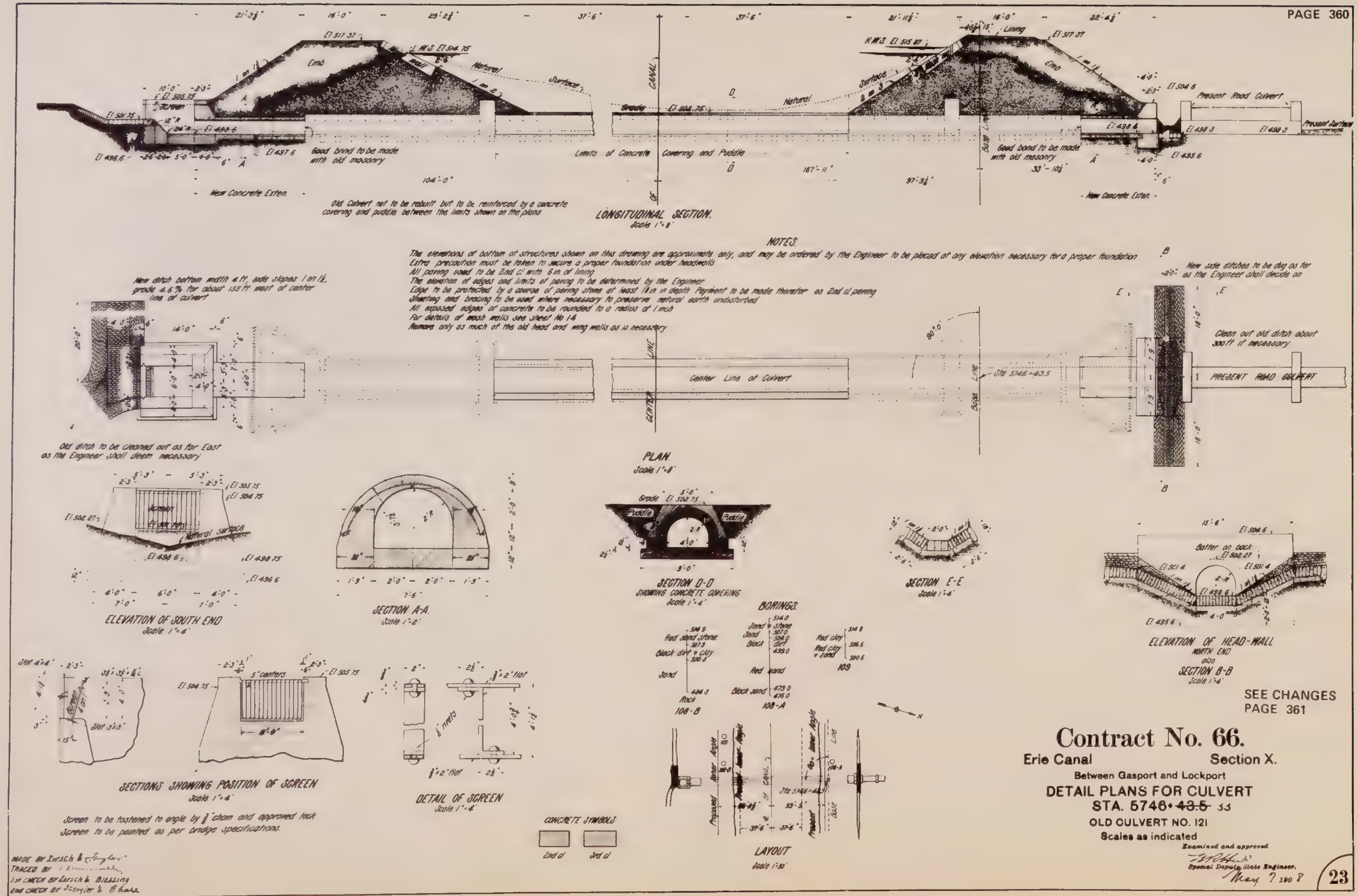
Exit

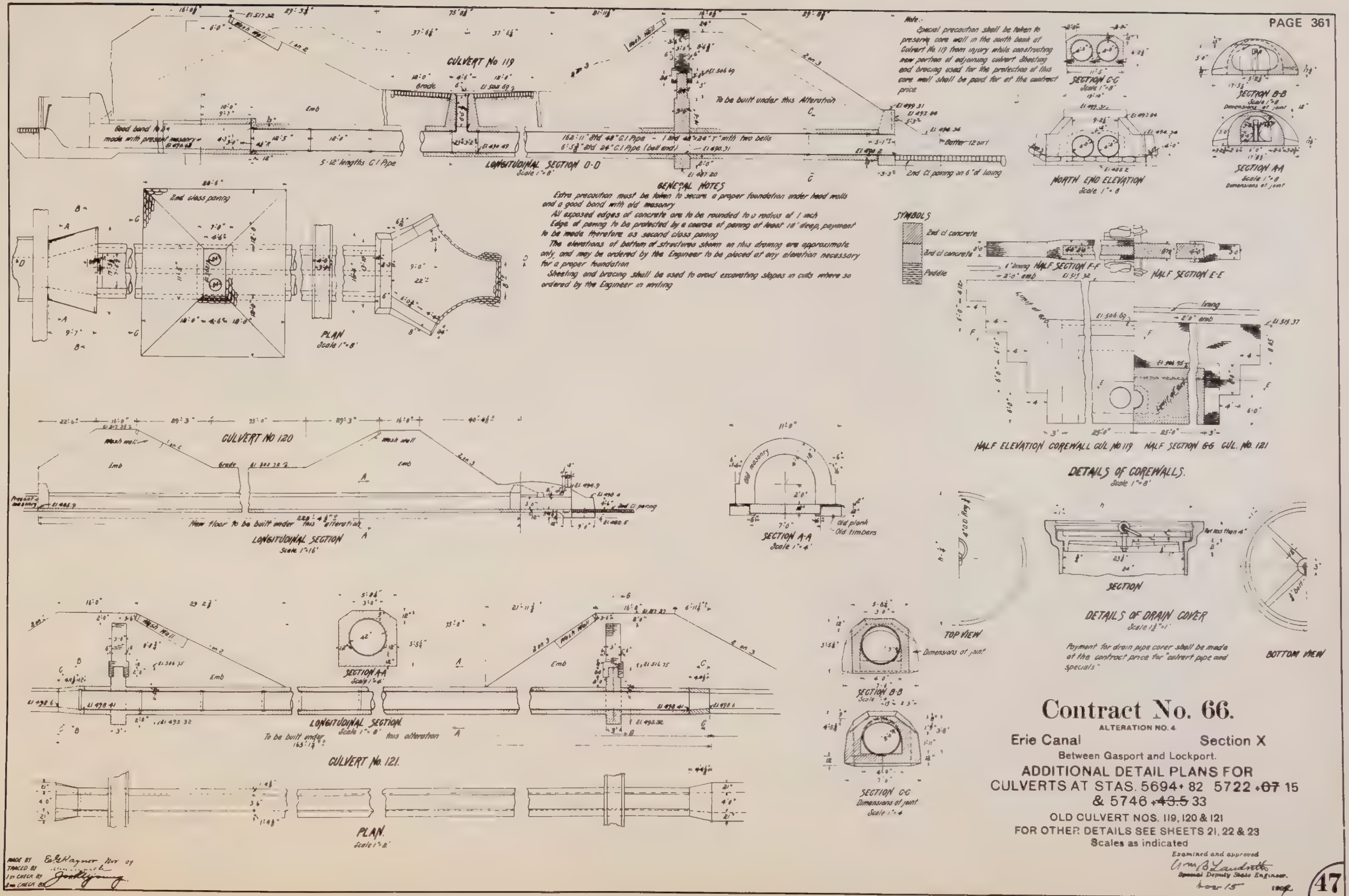
Headwall scaled all along the top half.

Entrance

Headwall and wingwalls in good condition

Concrete box in good condition. Slow seepage at some joints. Culvert was filled with 1' deep mud at time of inspection, but it was being cleaned out.


LONGITUDINAL SECTION.
Scale 1"=8'
Old Culvert not to be rebuilt but to be reinforced by a concrete covering and puddle between the limits shown on the plans
New Concrete Exten.
Good bond to be made with old masonry
Limits of Concrete Covering and Puddle
Present Road Culvert
NOTES.
The elevations of bottom of structures shown on this drawing are approximate only, and may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation
Extra precaution must be taken to secure a proper foundation under headwalls
All paving used to be 2nd cl with 6 in. of lining
The elevation of edges and limits of paving to be determined by the Engineer
Edge to be protected by a course of paving stone at least 18 in in depth Payment to be made therefor as 2nd cl paving
Sheeting and bracing to be used where necessary to preserve natural earth undisturbed
All exposed edges of concrete to be rounded to a radius of 1 inch
For details of wash walls see sheet No 14
Remove only as much of the old head and wing walls as is necessary
New ditch bottom width 4 ft, side slopes 1 on 1½, grade 4.6% for about 155 ft west of center line of culvert
New side ditches to be dug as far as the Engineer shall decide on
Clean out old ditch about 300 ft if necessary
Old ditch to be cleaned out as far East as the Engineer shall deem necessary
Center Line of Culvert
PRESENT ROAD CULVERT
Sta 5746+43.5
PLAN
Scale 1"=8'
ELEVATION OF SOUTH END
Scale 1"=4'
SECTION A-A.
Scale 1"=2'
SECTION D-D
SHOWING CONCRETE COVERING
Scale 1"=4'
SECTION E-E
Scale 1"=4'
ELEVATION OF HEAD-WALL
NORTH END
also
SECTION B-B
Scale 1"=4'
BORINGS.
108-B
108-A
109
SECTIONS SHOWING POSITION OF SCREEN
Scale 1"=4'
Screen to be fastened to angle by ⅜" chain and approved lock
Screen to be painted as per bridge specifications.
DETAIL OF SCREEN
Scale 1"=4'
CONCRETE SYMBOLS
2nd cl
3rd cl
LAYOUT
Scale 1"=50'
SEE CHANGES
PAGE 361
Contract No. 66.
Erie Canal
Section X.
Between Gasport and Lockport
DETAIL PLANS FOR CULVERT
STA. 5746+~~43.5~~ 53
OLD CULVERT NO. 121
Scales as indicated
Examined and approved
Special Deputy State Engineer.
May 7 1908
23
MADE BY Zersch & Tayler
TRACED BY
1st CHECK BY Zersch & Blessing
2nd CHECK BY Schuyler & Blake



Contract No. 66.

ALTERATION NO. 4

Erie Canal — Section X

Between Gasport and Lockport.

ADDITIONAL DETAIL PLANS FOR CULVERTS AT STAS. 5694+82 5722+~~07~~ 15 & 5746+~~43.5~~ 33

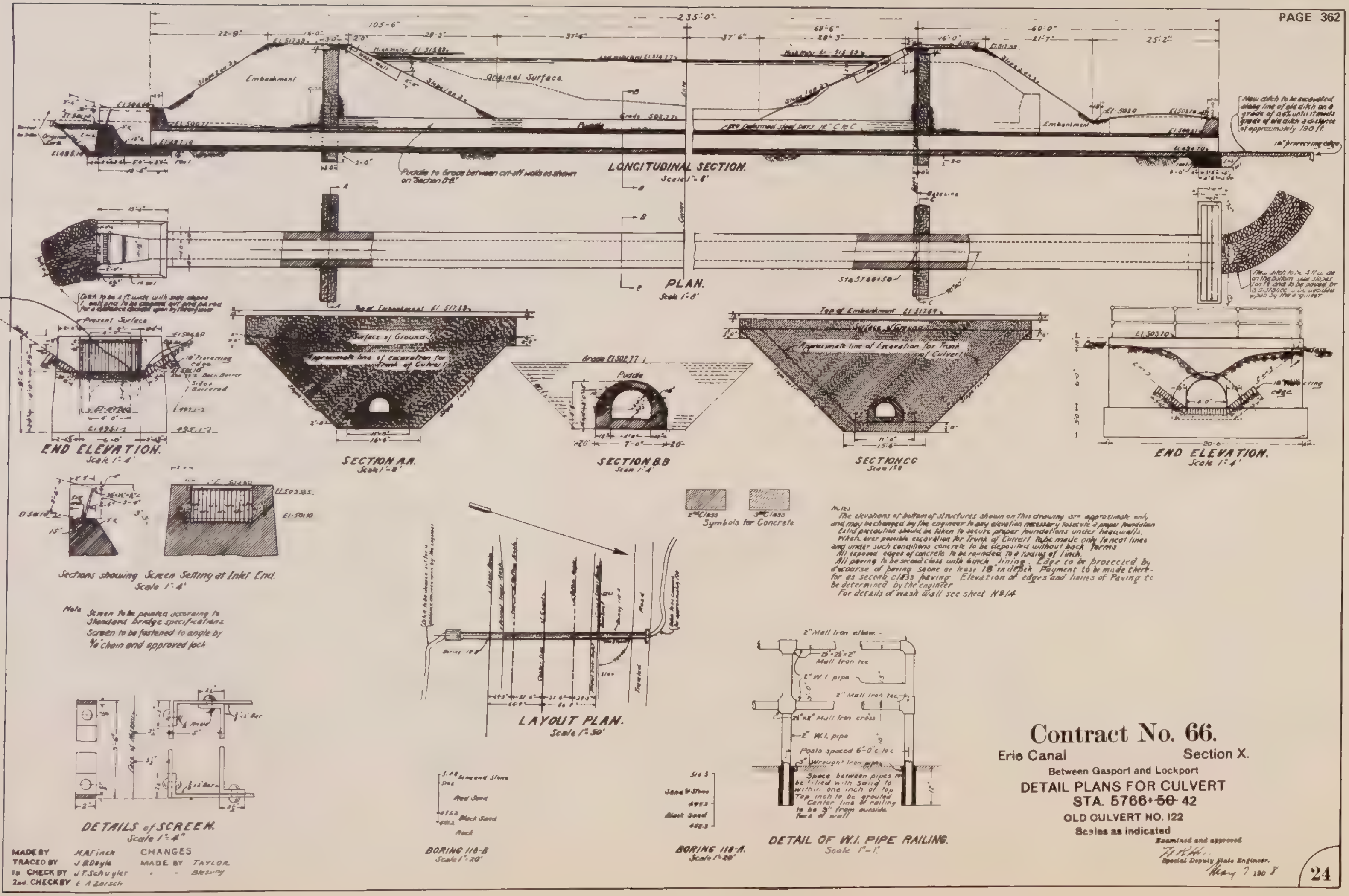
OLD CULVERT NOS. 119, 120 & 121

FOR OTHER DETAILS SEE SHEETS 21, 22 & 23

Scales as indicated

Examined and approved
Wm B Landreth
Special Deputy State Engineer.
Nov 15 1909

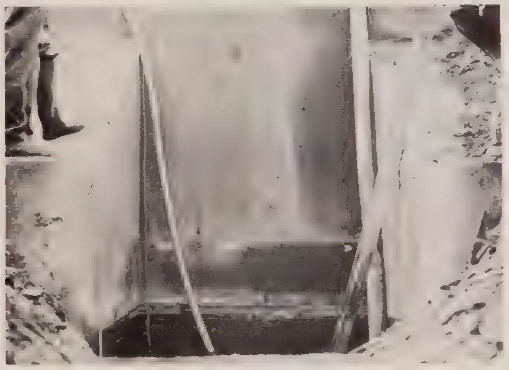
MADE BY E. G. Haynes Nov 09
TRACED BY
1st CHECK BY
2nd CHECK BY



LONGITUDINAL SECTION.
Scale 1" = 8'
Embankment
Original Surface.
Puddle to Grade between cut-off walls as shown on "Section B.B."
PLAN.
Scale 1" = 8'
END ELEVATION.
Scale 1" = 4'
SECTION A.A.
Scale 1" = 8'
SECTION B.B
Scale 1" = 4'
Puddle
SECTION C.C
Scale 1" = 8'
Top of Embankment El. 517.89
Surface of Ground
Approximate line of Excavation for Trunk of Culvert
END ELEVATION.
Scale 1" = 4'
Sections showing Screen Setting at Inlet End.
Scale 1" = 4'
Note Screen to be painted according to Standard bridge specifications. Screen to be fastened to angle by 3/16" chain and approved lock
2nd Class
3rd Class
Symbols for Concrete
Notes
The elevations of bottom of structures shown on this drawing are approximate only, and may be changed by the engineer to any elevation necessary to secure a proper foundation.
Extra precaution should be taken to secure proper foundations under headwalls.
Wherever possible excavation for Trunk of Culvert to be made only to neat lines and under such conditions concrete to be deposited without back forms.
All exposed edges of concrete to be rounded to a radius of 1 inch.
All paving to be second class with 6 inch lining. Edge to be protected by a course of paving stone at least 18" in depth. Payment to be made therefor as second class paving. Elevation of edges and limits of Paving to be determined by the engineer.
For details of wash wall see sheet No. 214
LAYOUT PLAN.
Scale 1" = 50'
DETAILS of SCREEN.
Scale 1" = 4"
BORING 118-B
Scale 1" = 20'
BORING 118-A.
Scale 1" = 20'
2" Mall Iron elbow.
2" W.I. pipe
2" Mall Iron tee
2" W.I. pipe
Posts spaced 6'-0" c to c
Space between pipes to be filled with sand to within one inch of top. Top inch to be grouted. Center line of railing to be 3" from outside face of wall
DETAIL OF W.I. PIPE RAILING.
Scale 1" = 1'
Contract No. 66.
Erie Canal
Section X.
Between Gasport and Lockport
DETAIL PLANS FOR CULVERT
STA. 5766+50 42
OLD CULVERT NO. 122
Scales as indicated
Examined and approved
Special Deputy State Engineer.
May 7 1908
MADE BY H.A. Finch
TRACED BY J.R. Doyle
1st CHECK BY J.T. Schuyler
2nd CHECK BY E.A. Zorsch
CHANGES MADE BY Taylor

Culvert #123 (Dive) 262' of 30" Cast Iron Pipe

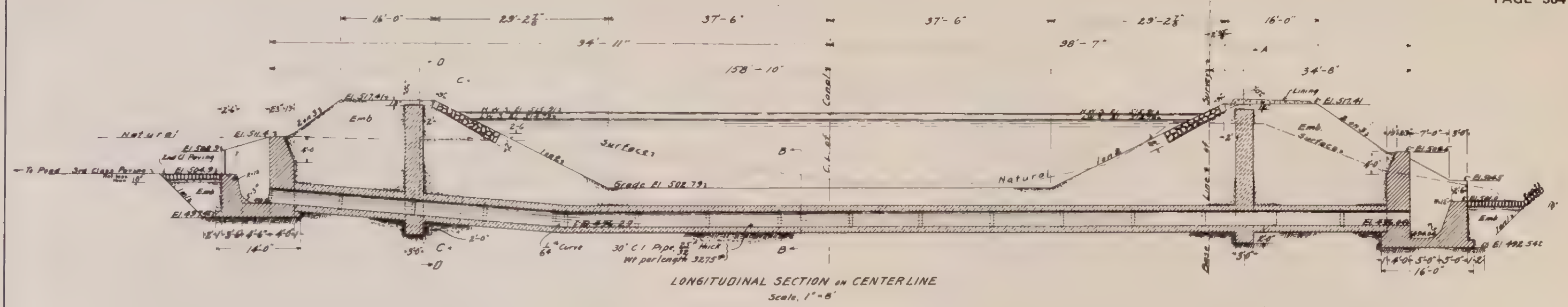
Entrance
Manhole entrance was in good condition.

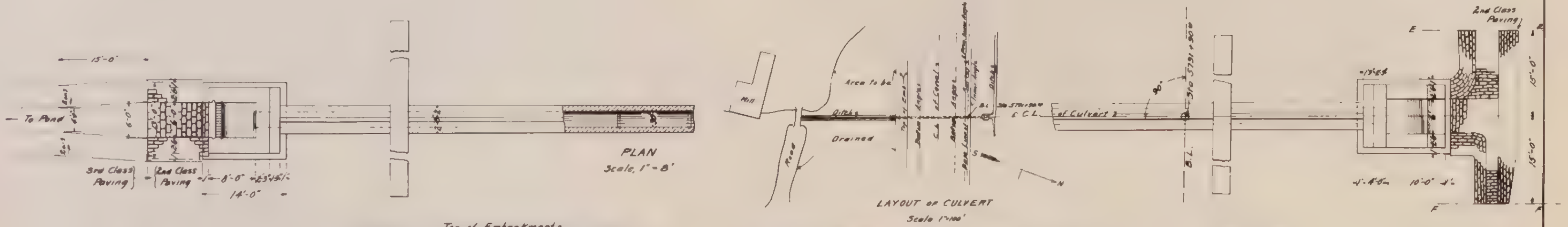


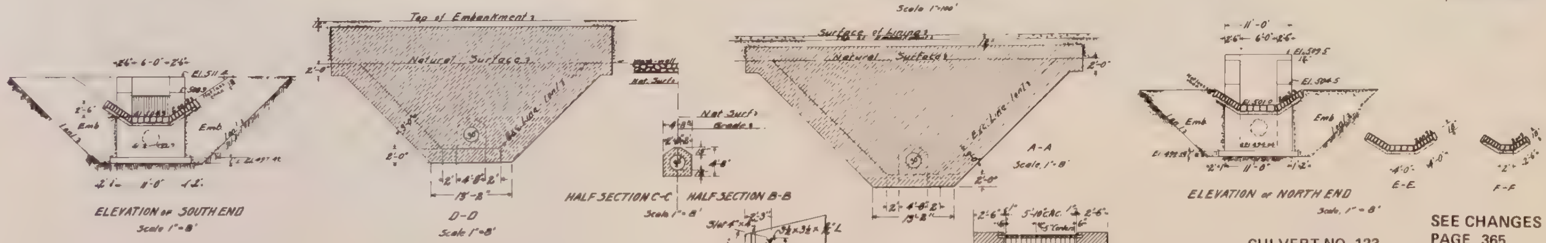
Exit
Headwall and wingwalls were in good condition. There were only a few small cracks

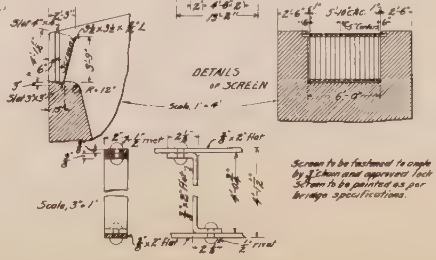
This 30" cast iron pipe carries two steel 6" sewage pipes along the bottom. One joint leaked (steady drip stream) about 20' from manhole entrance. Cast iron pipe was in good condition.

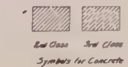
Exit
Looking down into pumped out culvert well.











The elevations of the bottom of the structure shown on this sheet are approximate only, and may be changed by the Engineer to any elevation necessary for a proper foundation
Extra precautions must be taken to secure a proper foundation under headwalls
All paving of the 2nd Class to have 6" of lining underneath
Third Class paving to have 4" of lining
All exposed edges of concrete are to be rounded to a radius of 1", except where otherwise shown.
Edges of 2nd Class paving to be protected by a course of paving stone at least 18" deep This course to be paid for as 2nd Class paving
Edges of 3rd Class paving to be protected by a course of paving at least 18" deep This course to be paid for as 3rd Class paving.

Screen to be fastened to angle by 3/8" chain and approved lock
Screen to be painted as per bridge specifications.

SEE CHANGES PAGE 365

CULVERT NO. 123

Contract No. 66.

Erie Canal — Section X.

Between Gasport and Lockport

DETAIL PLANS FOR CULVERT.

STA. 5791+~~90~~ 60

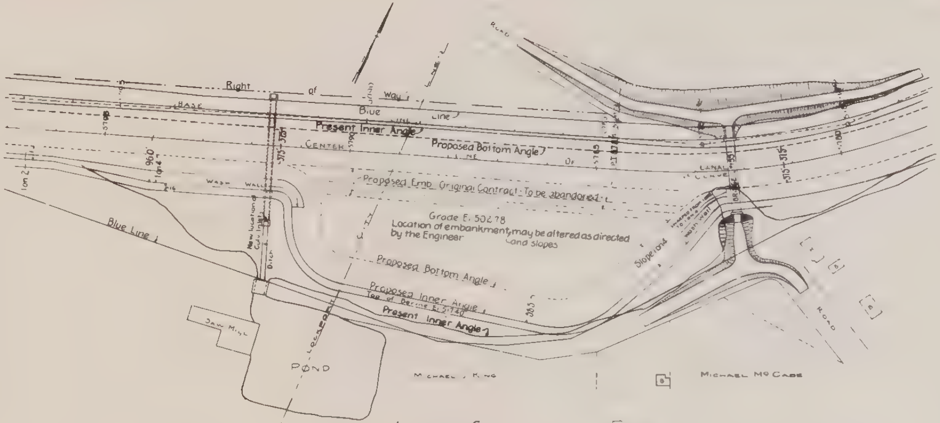
NEW CULVERT LOCATION

Scales as indicated

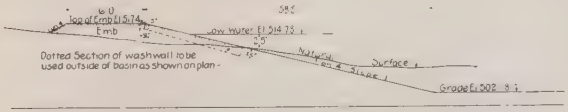
Examined and approved
Special Deputy State Engineer
May 7 1908

MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY

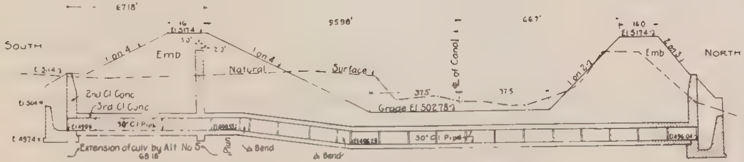
25



LOCATION SKETCH
Scale 1"=100'



TYPICAL SECTION OF SOUTH SLOPE
Scale 1"=10'



LONGITUDINAL SECTION - CULVERT No. 123
SHOWING EXTENSION
Scale
Hor - 1"=20, Vert - 1"=10'
(Wash Wall not shown)

All details and dimensions not shown to be furnished by the Engr.

Contract No. 66

ALTERATION NO. 5

Erie Canal Section 10

PLAN OF EXTENSION OF SOUTH END OF CULVERT 123 & LOCATION SKETCH OF TURNING BASIN

Scales as indicated

Examined and approved

June 1, 1910

Wm. B. Landreth

Special Deputy State Engineer.

MADE BY
TRACED BY
1st CHECK BY
2nd CHECK BY

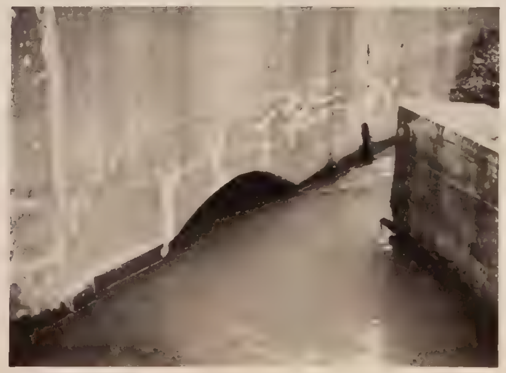
Culvert #124 157' of 2.5' X 2.5' Concrete Box
Not Inspected

Entrance Area
Manhole in sidewalk is not entrance. Entrance manhole is under the lawn next to the edge of canal. Exit manhole is buried under the canal towpath on far side of the canal.

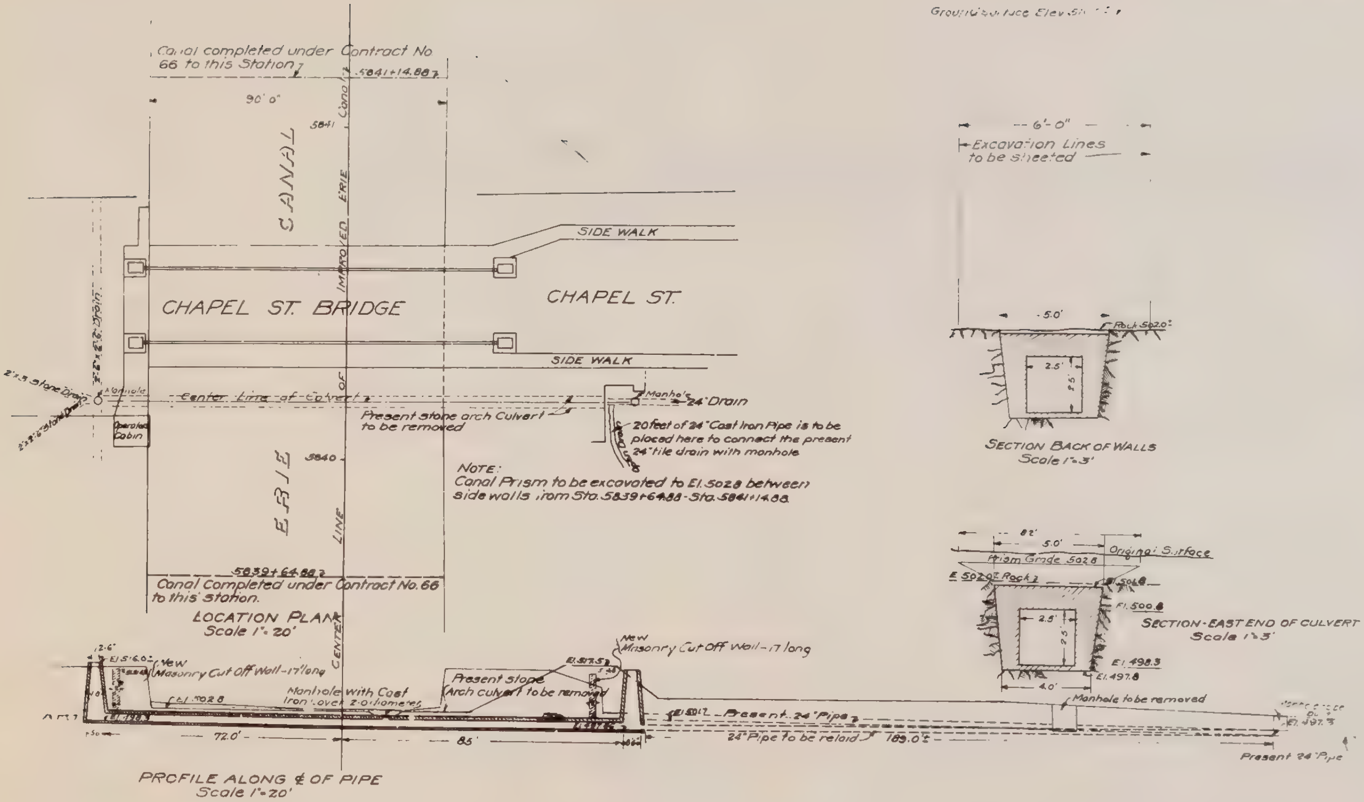
Culvert 125 Exit Area
An old mill once existed here

Culvert #125 (Dive) 118' of 12' Wide by 5'10" High Concrete Arch and 40' of Stone Block Arch
Not Inspected

Entrance
Culvert entrance is under the waterfall. See Lockport Waste Gate and Weir Section for description of problem and pictures.

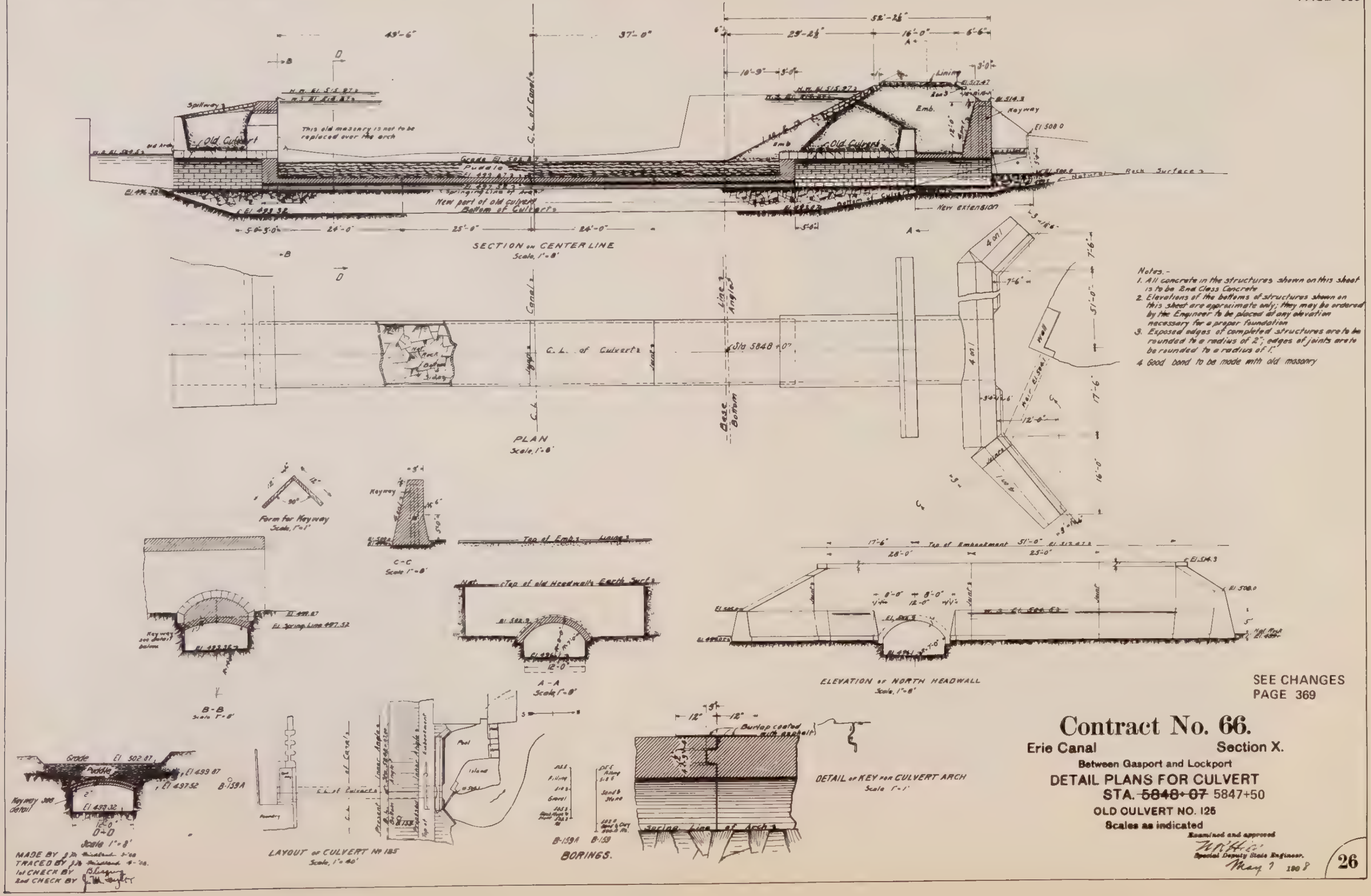


Exit
Headwall in fair to good condition with a few cracks.



SKETCH SHOWING PROPOSED 2.5'x2.5' CONCRETE CULVERT UNDER THE ERIE CANAL AT CHAPEL ST. TO REPLACE PRESENT STONE CULVERT.

CULVERT NO. 144
STA. 5840+18



Notes.-
1. All concrete in the structures shown on this sheet is to be 2nd Class Concrete
2. Elevations of the bottoms of structures shown on this sheet are approximate only; they may be ordered by the Engineer to be placed at any elevation necessary for a proper foundation
3. Exposed edges of completed structures are to be rounded to a radius of 2"; edges of joints are to be rounded to a radius of 1"
4. Good bond to be made with old masonry

SEE CHANGES
PAGE 369

Contract No. 66.

Erie Canal — Section X.

Between Gasport and Lockport

DETAIL PLANS FOR CULVERT

STA. ~~5848+07~~ 5847+50

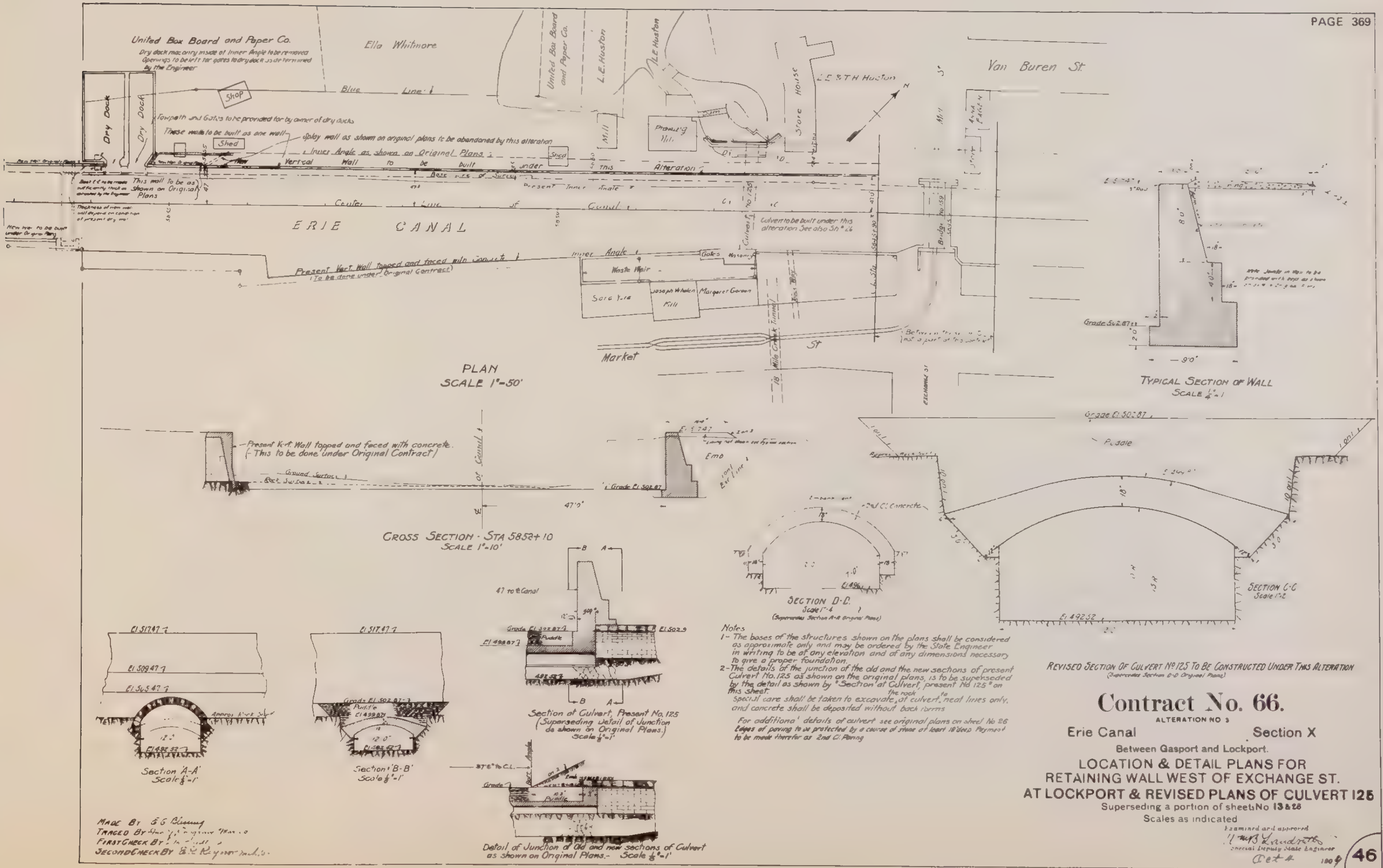
OLD CULVERT NO. 125

Scales as indicated

Examined and approved

Special Deputy State Engineer.

May 7 1908


United Box Board and Paper Co.
Ella Whitmore
Van Buren St.
Blue Line
Dry Dock
Shop
Shed
Vertical Wall to be built under This Alteration
Center Line of Canal
ERIE CANAL
Present Vert. Wall topped and faced with Concrete
(To be done under Original Contract)
Inner Angle
Waste Weir
Market St
Store House
Mill
PLAN
SCALE 1"=50'
TYPICAL SECTION OF WALL
SCALE 1/4"=1'
Present Vert. Wall topped and faced with concrete.
(This to be done under Original Contract)
CROSS SECTION - STA 5852+10
SCALE 1"=10'
SECTION D-D
SECTION C-C
REVISED SECTION OF CULVERT No 125 TO BE CONSTRUCTED UNDER THIS ALTERATION
Section 'A-A'
Section 'B-B'
Section at Culvert, Present No. 125
(Superseding Detail of Junction as shown on Original Plans.)
Detail of Junction of Old and new sections of Culvert as shown on Original Plans.
Notes
1 - The bases of the structures shown on the plans shall be considered as approximate only and may be ordered by the State Engineer in writing to be at any elevation and of any dimensions necessary to give a proper foundation.
2 - The details of the junction of the old and the new sections of present Culvert No. 125 as shown on the original plans, is to be superseded by the detail as shown by "Section at Culvert, present No 125" on this sheet.
Special care shall be taken to excavate the rock at culvert to neat lines only, and concrete shall be deposited without back forms.
For additional details of culvert see original plans on sheet No 26
Contract No. 66.
ALTERATION NO 3
Erie Canal
Section X
Between Gasport and Lockport.
LOCATION & DETAIL PLANS FOR
RETAINING WALL WEST OF EXCHANGE ST.
AT LOCKPORT & REVISED PLANS OF CULVERT 125
Superseding a portion of sheets No 13 & 28
Scales as indicated
Made By
Traced By
First Check By
Second Check By
46

IRONDEQUOIT AND BUSHNELL BASIN TROUGH FLOOR CORES
(See August 1975 Canal Report for Additional Data and Pictures)

On October 29, 1974, a 100 foot long section of the Bushnell Basin Trough floor collapsed into a sewer tunnel being placed under the Barge Canal. During repairs in 1975, the Soil Mechanics Bureau requested that cores be taken down through the floor of the nearby Irondequoit Trough to determine if any voids existed under the trough floor.

Thirty cores were taken along the approximate center line of the trough. The interval between cores on the eastern half of the trough was 100 feet, which was increased to 250 feet for the western half. As the core holes did not show the presence of any voids under the slab, the holes were plugged with concrete.

In 1912, a 500 foot long section of the Irondequoit Trough over Culvert 30 collapsed. Reconstruction of the trough floor in this area (Contract 63-A) resulted in a triple slab floor. Cores 15-20, taken from the reconstructed area, were not progressed deep enough to penetrate the third slab which exists 1.5 feet lower.

Two cores (B.B. 6 and B.B. 7) were taken from the Bushnell Basin Trough floor as part of the investigation to determine required repairs for the Bushnell Basin Trough. Both cores had a 1-2 inch layer of cement grout directly under the top slab. This grout was placed by Canal Maintenance Forces in the middle 1960's.

Core B.B. 34 was obtained from under the I490 Bridge. While driving piles in 1954 to support the I490 Bridge, 1-2 feet of ground settlement or consolidation occurred inside the steel cofferdams next to the east end of the Bushnell Basin Trough. Usually, the ground is forced upward into the confined space of a cofferdam as the piles are driven. Later investigation revealed approximately 6 inches of settlement under nearby areas of the trough floor. Portions of the trough floor under the I490 Bridge were removed,the voids filled, and the floor was replaced. No voids were found under the trough floor area represented by Core B.B. 34.

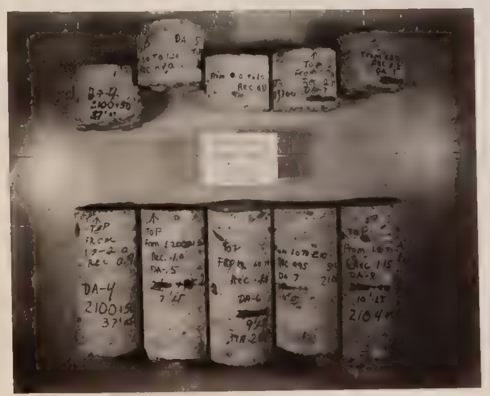
All the cores, except B.B.6, were transmitted to the Materials Bureau for evaluation. The cores and the tar felt waterproofing membrane on top of the bottom slab were all still in good condition.

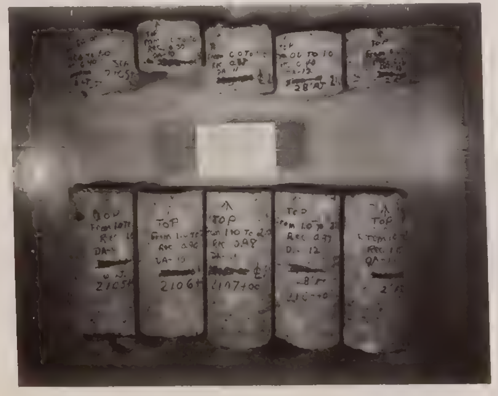
Conclusion

All cores indicate that the concrete in the trough floors represented by the cores is, generally, in good condition. If the top slab has deteriorated in some small areas it is anticipated that the bottom slab should still be in good condition. However, any existing cracks in the bottom slab would be just about impossible to find.

IRONDEQUOIT TROUGH FLOOR CORES

Core Number	Top Slab Thickness	Sand Cushion Thickness	Bottom Slab Thickness	Depth of Core Hole	Total Concrete Recovered	Comments
4	5"	6-1/2"	11-1/4"	22-3/4"	16-1/4"	
5	5"	9-1/2"	12"	26-1/2"	17"	*Rebar 4" from top
6	4-1/2"	7-1/2"	12-1/4"	24-1/4"	16-3/4"	Rebar 6" from top
7	4-1/2"	7-1/2"	11-1/2"	23-1/2"	16"	
8	4-1/4"	9"	14"	27-1/4"	18-1/4"	Rebar 2-1/2" and 13" from top
9	4-1/2"	7-1/2"	12-3/4"	24-3/4"	17"	Rebar 6" from top
10	3-1/2"	9-1/2"	10-3/4"	23-3/4"	14-1/4"	
11	4-1/2"	7-1/2"	11-3/4"	23-3/4"	16-1/4"	3" deep vertical crack on top of bottom slab
12	4-3/4"	7"	11-3/4"	23-1/2"	16-1/2"	
13	4-1/4"	7-3/4"	12"	24"	16-1/4"	Rebar 1-1/4" and 3" from top

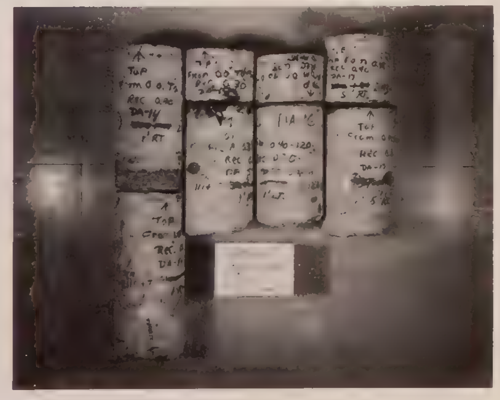


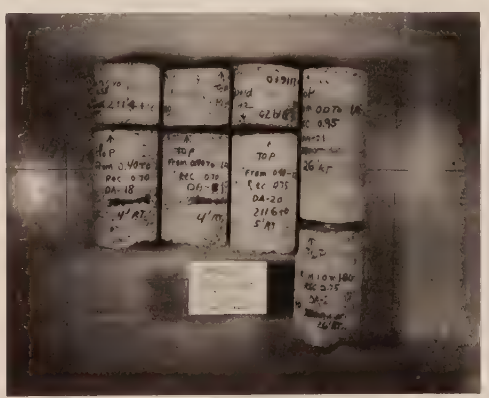


*Rebar = Steel reinforcing bar in bottom slab.

IRONDEQUOIT TROUGH FLOOR CORES

Core Number	Top Slab Thickness	Sand Cushion Thickness	Bottom Slab Thickness	Depth of Core Hole	Total Concrete Recovered	Comments
14	10-1/2"	none	12-1/2"	23"	23"	Beginning of 1912 breach repairs
15	3-3/4"	none	9-1/2"	13"	13"	Rebar 4-1/8" from top
16	3-1/2"	none	9-1/4"	12-3/4"	12-3/4"	
17	5"	none	9-1/2"	14-1/2"	14-1/2"	Rebar 5" from top
18	4-1/2"	none	8-3/4"	13-1/4"	13-1/4"	Top slab cracked
19	4-1/4"	none	8-1/2"	12-3/4"	12-3/4"	Top slab cracked
20	4-1/2"	none	9"	13-1/2"	13-1/2"	
21	11-1/4"	none	9"	20-1/4"	20-1/4"	Cored through large stone. Possibly end of 1912 breach repairs.

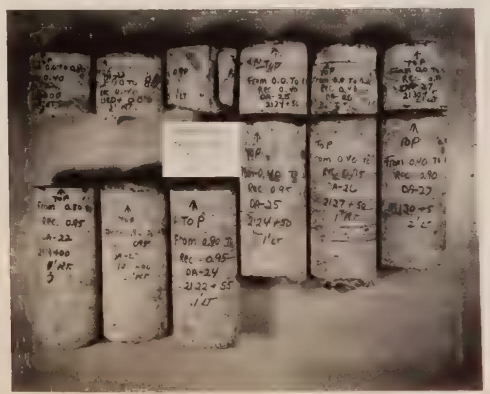


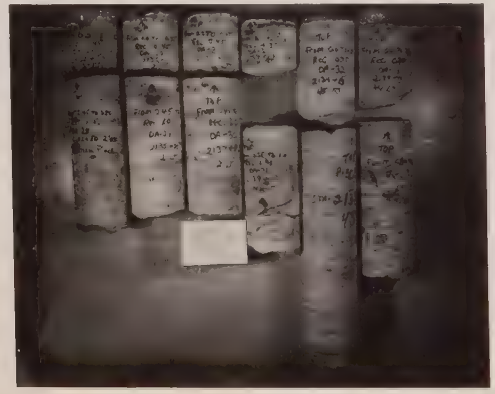


NOTE: A tar-felt waterproof membrane exists on top of all bottom slab concrete.

IRONDEQUOIT TROUGH FLOOR CORES

Core Number	Top Slab Thickness	Sand Cushion Thickness	Bottom Slab Thickness	Depth of Core Hole	Total Concrete Recovered	Comments
22	4-1/2"	5"	11-3/4"	21-1/4"	16-1/4"	
23	4-1/2"	5"	11-1/4"	20-3/4"	15-3/4"	
24	4-1/4"	6"	11-1/2"	21-3/4"	15-3/4"	Cored through joint
25	5-1/4"	none	11-1/2"	16-3/4"	16-3/4"	Rebar 2-1/2" and 4" from top
26	5"	none	11-1/2"	16-1/2"	16-1/2"	
27	5"	none	10-3/4"	15-3/4"	15-3/4"	
28	5-1/4"	none	13-3/4"	19"	19"	
29	5-1/2"	none	12-1/4"	17-3/4"	17-3/4"	
30	5-1/4"	none	12-1/4"	17-1/2"	17-1/2"	
31	4-1/4"	5"	11-1/4"	15-1/2"	15-1/2"	Bottom slab cracked near bottom
32	8-3/4"	none	23"	31-3/4"	31-3/4"	Intentional break near bottom. Cored through thrust block at toe of slope.
33	7-1/2"	none	14-1/4"	21-3/4"	21-3/4"	Possibly edge of washwall cored.





BUSHNELL BASIN TROUGH FLOOR CORES

Core Number	Top Slab Thickness	Sand Cushion Thickness	Bottom Slab Thickness	Depth of Core Hole	Total Concrete Recovered	Comments
34	8-3/4"	7-3/4"	13"	29-1/2"	21-3/4"	
6	10¼" + 1¼" grout	6"	13-1/4"	30-3/4"	23-1/2"	Soils data. Core never received.
7	9½" + 2" grout	5"	12"	28-1/2"	21-1/2"	

CANAL FLOOR LINING
BUSHNELL BASIN (I-490) TO CARTERSVILLE GUARD GATE

The two mile long canal section from the Bushnell Basin Trough at the east end to the Cartersville Guard Gate at the west end is completely lined with concrete. The sides of the canal prism are either vertical walls, as in the Bushnell Basin and Irondequoit Troughs, or concrete slabs placed on the inside slopes.

Construction of the prism floor, however, involved about 5 different configurations at various locations. Since many contract changes were involved during construction, there was confusion as to what was constructed where. Therefore, a station to station prism floor configuration was compiled from the contract plans. Recent cores from the Irondequoit Trough floor showed that one floor area was not as planned. This area was probably constructed prior to an alteration and it was not changed.

CANAL FLOOR LINING

BUSHNELL BASIN TROUGH (Prior to 1974 breach)
Begin Station 2059+05
End Station 2069+30
Length 1025 ft.

1913 Plans, Contract 63, Alteration 10, Sheet 159
- 4" Top Slab (10' square sections)
- 6" Sand Filling
- ½" Tar Felt Waterproofing
- 12" Bottom Slab (30' square sections) (3/8" bars under upper slab joints)

Under Contract M75-2 in 1975, an approximately 240 foot long section near the center of the trough was rebuilt.

BUSHNELL BASIN PRISM LINING
Begin Station 2069+30
End Station 2075+15
Length 585 ft.

1914 Plans, Contract 63, Alteration 13, Sheet 164
- 12" Slab (8' square sections)

BUSHNELL BASIN PRISM LINING (Includes 468' Retaining Wall, 1911 breach)
Begin Station 2075+15
End Station 2093+00
Length 1785 ft.

1911 Plans, Contract 63, Alteration 3, Sheet 143
- 4" Top Slab (10' square sections)
- 6" Sand Filling
- ½" Tar Felt Waterproofing
- 12" Bottom Slab (30' square sections) (3/8" bars under upper slab joints)

BUSHNELL BASIN PRISM LINING
Begin Station 2093+00
End Station 2099+15
Length 615 ft.

1914 Plans, Contract 63, Alteration 13, Sheet 164
- 12" Slab (8' square sections)

CANAL FLOOR LINING

IRONDEQUOIT TROUGH
Begin Station 2099+15
End Station 2110+70
Length 1155 ft.

1911 Plans, Contract 63, Alteration 3, Sheet 144
- 4" Top Slab (10' square sections)
- 6" Sand Filling
- ½" Tar Felt Waterproofing
- 12" Bottom Slab (30' square sections)
  (3/8" bars under upper slab joints)

IRONDEQUOIT TROUGH
(1912 breach area)
Begin Station 2110+70
End Station 2117+75
Length 705 ft.

1915 Plans, Contract 63-A, Sheets 10 & 20
- 4" Top Slab (12'x15' sections, south half)
  (12'x12.5' north half)
- ½" Tar Felt Waterproofing
- 8" Middle Slab (35'x30'± sections) (.56 sq. in. bars (#7 bars))
- 12"-24" Screened Gravel (tapers from center toward sides)
- 12" Bottom Slab (35'x52' sections, south half)
  (35'x43' sections, north half)
  (8' wide x 6" high slabs with .56 sq. in. bars over joints)

IRONDEQUOIT TROUGH

	*Specified	Actual
Begin Station	2117+75	2117+75
End Station	2141+00	2124+00
Length	2325 ft.	625 ft.

1911 Plans, Contract 63, Alteration 3, Sheet 145 & 144
- 4" Top Slab (10' square sections)
- 6" Sand Filling
- ½" Tar Felt Waterproofing
- 12" Bottom Slab (30' square sections)
  (3/8" bars under upper slab joints)

* Although Alteration #3 (Nov. 1911) plans specified the above trough floor system, concrete cores from the trough floor showed that most of this segment had already been constructed according to Alteration #2 (Sept. 1911) plans. Somewhere between cores taken at Station 2122+55 and 2125+00 is the transition. The assumed transition station is 2124+00.

CANAL FLOOR LINING

IRONDEQUOIT TROUGH
Begin Station 2124+00
End Station 2137+59
Length 1359 ft.

1911 Plans, Contract 63, Alteration #2, Sheet 141
- 5" Top Slab (10' square sections)
- ½" Tar Felt Waterproofing
- 12½" Bottom Slab (30' square sections)
  (3/8" bars under upper slab joints)

IRONDEQUOIT TROUGH
Begin Station 2137+59
End Station 2141+00
Length 341 ft.

1911 Plans, Contract 63, Alteration #3, Sheet 145
- 4" Top Slab (10' square sections)
- 6" Sand Filling
- ½" Tar Felt Waterproofing
- 12" Bottom Slab (30' square sections)
  (3/8" bars under upper slab joints)

CARTERSVILLE PRISM LINING
Begin Station 2141+00
End Station 2166+69
Length 2569 ft.

1915 Plans, Contract 63-A, Sheet 11 (Contract Terminated by State)
- 12" Slab (30'x30-40' transverse sections)

CARTERSVILLE PRISM LINING
Begin Station 2166+69
End Station 2167+29 Guard Gate
Length 60 ft.

1918 Plans, Contract 201, Sheet 2
- 12" Slab (30'x30-40' transverse sections)

Grouted stone blocks placed by Contract 63 removed. Other small areas, such as slopes and floor under temporary timber towpath bridge, also paved.

CARTERSVILLE PRISM LINING
Begin Station 2167+29
End Station 2167+45± Guard Gate Sills
Length 16 ft.

15" Slab, grouted stone blocks placed by contract 63 removed

INTRODUCTION

BARGE CANAL CONSTRUCTION

BUSHNELLS BASIN TO CARTERSVILLE

Early in 1900, the small Towns of Bushnells Basin and Cartersville existed approximately two miles apart on the Erie Canal in the Monroe County Township of Perinton. Over the years, the Town of Bushnells Basin has continued to prosper, but Cartersville ceased to exist soon after completion of the Barge Canal. Today,the only map reference to Cartersville is by the name of the canal guard gate just east of Pittsford, which is still called the Cartersville Guard Gate.

Construction of the Barge Canal between these two places involved one of the most difficult and time-consuming series of projects on the whole 524-mile long Barge Canal System. Numerous problems were encountered which led the engineers to change the original contract construction plans many times.

After the October 1974 collapse of the Bushnell Basin Trough, the Materials Bureau was asked to evaluate the concrete structures on this section of the canal. Early field inspections revealed much unusual construction and this led to a study of the original plans and alterations.

Between 1909 and 1918, a total of four different contracts, plus work by the Superintendent of Public Works, was involved in building this short two-mile section of the Barge Canal. The original contract construction plans and all the many alterations were very confusing as to what was supposed to be constructed, what was actually constructed, and the sequence of construction. After months of research and study, a fairly clear understanding of the whole series of original construction operations in this area has been gained from the following sources:

1. Original contract plans and alterations
2. Report of the Superintendent of Public Works on Canals
3. Report of the State Engineer and Surveyor
4. History of the Barge Canal by Whitford
5. Personel observation
6. Personal interviews
7. Syracuse Canal Museum
8. Rochester Public Library

Therefore, in order to partially explain the events which occurred during the original construction of the Barge Canal and recent repairs, a short history of the Bushnell Basin-Cartersville area has been written. One should also keep in mind that canal traffic and the tow path (many barges were still pulled by horses and mules) had to be maintained between May 15 and November 15

at all times. This created extra hardships on contractors where the Erie and Barge Canals coincided, since much of the work had to be done in winter.

On April 6, 1917, the United States entered World War I and canal construction soon began to fall behind the 1918 opening schedule. Army enlistments resulted in severe labor shortages and war production caused drastic cutbacks in steel and other materials for non-military use. This also led to high inflation and much greater costs to contractors than originally bid. Although the Barge Canal may not have been considered essential to the war effort by everyone, the Erie Canal was transporting materials and foodstuffs destined for overseas. Therefore, completion of the much larger capacity Barge Canal on schedule would provide a tremendous avenue from the industrial midwest to the sea for all types of goods and even small war ships built on the Great Lakes.

Every effort was made to attain this goal. As men and machines temporarily became available from one contract, agreements provided for their immediate transfer to other contracts and back again when necessary to provide maximum use of all resources. Repair of the Irondequoit Trough and lack of steel for railroad structures over the Canal at Rochester both threatened to delay opening of the last segments. Finally, the trough repair was complete, but the structural steel did not arrive. Hasty agreements were made for one railroad to use the tracks of others already over the canal so that deep rock cuts could be completed.

Early on May 15, 1918, two small ceremonies, witnessed by only a dozen or so people, were held as Mr. Frank Williams, State Engineer, dug a small trench across two dikes on opposite sides of the Genesee River. As machines continued to remove the dikes, water poured into the last two dry canal sections and the Barge Canal was officially opened on schedule. Although another four years passed before all construction was complete, the largest barge capable of passing through the locks could now travel from Albany to Buffalo. Completion of the Barge Canal was soon hailed as one of the greatest engineering feats up to that time.

HISTORY
BARGE CANAL CONSTRUCTION
BUSHNELL BASIN TO CARTERSVILLE

The Barge Canal was constructed on basically the same alignment in this area as the enlarged Erie Canal. This was accomplished by extending two culverts (#29 and #30) and rebuilding the embankments to permit the Erie to be deepened from 7 feet to 12 feet and widened on the bottom from 56 feet to 75 feet.

The only section of new alignment was west of Irondequoit Creek (Culvert #30) where the Erie Canal swung north about 600 feet to avoid a bend in Irondequoit Creek, and then south in a large "S" curve before joining the existing alignment at the Cartersville Guard Gate. Water surface elevation of the Erie and the new Barge Canal was approximately the same and there were no locks in this area.

Contract 41 Embankment Construction

In 1909, work began under Contract 41 on the construction of earth embankments that would eliminate the "S" curve of the Erie Canal. The east half of the "S" curve was eliminated by constructing a new diversion channel for Irondequoit Creek and building a high embankment in the old stream bed to support the new Barge Canal. This area is presently the west half of the Irondequoit Trough. To drain the low area left between the Erie Canal and the new embankment, a two-foot square concrete box culvert was built. It was placed along the existing side slope of the Erie embankment so that it would not be affected by any settlement in the new embankment. Thus, the culvert was 500 feet long.

Then the Erie crossed the present alignment at the west end of the Trough and swung south about 400 feet. This section of the curve was eliminated by constructing a new embankment on the north side only between the present end of the trough and the Cartersville Guard Gate. The low area between this new embankment and the Erie Canal, then known as the Cartersville Widewaters, was designated as a dumping ground for unsuitable embankment materials. Presently, State Route 96 exists on this filled area.

According to the 1909 State Engineers Report, "The embankments on this contract are made of pure sand, either deposited from dump cars and the material jetted away from the tracks by water-jets, or else pumped to the embankment site by hydraulic dredge."

Contract 63 Canal Widening and Concrete Structures

Between 1910 and 1914, the Barge Canal was constructed between the Wayne-Monroe County Line and Lock 32 under Contract 63. The two high embankment areas at Culverts #29 and #30 were the only ones designed to be lined with concrete. The 40 foot embankment at Bushnell Basin (Culvert #29) was to have a nine inch thick concrete slab lining the canal prism (floor and inside slopes) for 800 feet. At Irondequoit Creek, the canal was designed as a 2860 foot long trough with vertical walls and a waterproofed concrete floor on the 70 foot high embankment over Culvert #30.

About 700 feet east of the proposed trough, a 230 foot long concrete retaining wall was completed in May of 1911 in front of the Rochester Sand Company Pit (presently Russo Sand and Gravel Company). This dock wall facilitated the loading of barges with sand for use along the canal.

The Cartersville Guard Gate at the west end and the Bushnell Basin Guard Gate at the east end replaced nearby existing structures on the Erie designed to stop the flow of water in an emergency.

Due to north embankment erosion about 2000 feet west of Culvert #29, an 1800 foot long section of the inside slope was lined with wood planks (sheathing). This work was completed early in 1911.

At 4:00 P.M. on May 19, 1911, a break occurred at Bushnell Basin in the area of the sheathing which washed out about 100 feet of the north embankment. According to the 1911 Report of the Superintendent of Public Works, "This break was incidentally, if not directly, due to the operations of barge canal contractors." The 468 foot long Bushnell Basin Retaining Wall was immediately built to repair this area and canal traffic resumed on June 11.

Due to this break, embankment slides, and other leaks through the embankment in this vicinity, the need for more positive protective measures for lining the canal prism was emphasized. Alteration #3 (Nov. 1911) called for changing the nine inch thick concrete prism lining over Culvert #29 to a double slab, waterproofed floor with a vertical retaining wall on the north side and a 12 inch thick slab on the inside south slope. Except for the existing Bushnell Basin Retaining Wall, the canal prism was also lined with a double slab, waterproofed floor and 12 inch thick slab on the inside slopes from the east end of the retaining wall to some 1800 feet westerly by this alteration. The concrete slab on the north inside slope was placed over the wood sheathing.

Then, Alteration #10 (Jan. 1913) changed the 12 inch thick slab on the south inside slope of the Culvert #29 embankment to a vertical retaining wall, thus completing the present Bushnell Basin Trough.

Later, Alteration #13 (Feb. 1914) called for lining the two remaining unlined areas in this vicinity. The 585 foot long prism section between the Bushnell Basin Retaining Wall and the Bushnell Basin Trough, and the 615 foot long prism section between the Irondequoit Trough and the prism lining constructed under Alteration #3, were lined with a 12 inch thick slab on the floor and inside slopes, thus completing the present configuration.

After the 1911 break at Bushnell Basin, the proposed floor of the Irondequoit Trough was changed by Alteration #3 (Nov. 1911) to the same design proposed for the prism floor at the Bushnell Basin Trough and Retaining Wall. Also, this alteration extended the length of the trough 910 feet to the east end of the Rochester Sand Company Pit dock wall. At the west end, the north retaining wall was extended 60 feet, the south wall 120 feet and the prism

was lined with concrete for another 250 feet to where the Erie Canal crossed the new Barge Canal alignment.

In 1911, leaks were discovered in Culvert #30 under the Irondequoit Trough and an extra work order dated March 11, 1912 provided for reinforcing the arch ring of the culvert.

Then, at 8:45 on the morning of September 3, 1912, the nine foot high by 22.5 foot wide stone block arch culvert under the Irondequoit Trough apparently collapsed. This caused the trough to break and approximately 500 feet of embankment was also washed out. By October 15, a temporary trough or flume had been constructed over the breach to maintain canal traffic. The timber flume was 887 feet long, 22 feet wide, 7 feet deep and supported by 25-35 foot long wood piles.

In 1913, the Irondequoit Trough embankment was widened and the 500 foot long, box culvert lengthened by Alteration #11 (Feb. 1913). Thus, the culvert was now over 700 feet long.

In 1913, leaks also developed in Culvert #29 (6 foot wide by 5 foot high stone block arch) at Bushnells Basin. To maintain navigation, boatloads of clay were deposited on the trough floor to plug the leaks. After a late winter inspection, an extra work order dated April 8, 1914, provided for the placing of a cutoff wall (20 foot long steel sheet piling) at the east end of the Bushnell Basin Trough, removal and replacement of the damaged trough floor over Culvert #29, inserting a 48 inch cast iron pipe inside and strengthening of the old stone arch culvert, and other work deemed necessary.

After the 1914 navigation season, the floor of the Bushnell Basin Trough over Culvert #29 was strengthened under Alteration #15 (Sept. 1914). A ½-inch thick tar felt waterproofing membrane, which extended 70 feet on each side of the culvert, was first applied. Then alternate 60 foot long and 30 foot long railroad rails, which weighed 60 pounds per foot, were placed at right angles over the center of the culvert one foot apart on a thin bed of concrete. Reinforcing bars 3/8 inch in diameter were laid over the rails at right angles and then this was all embedded in a 1.6 foot thick concrete slab.

Meanwhile, in a letter dated May 8, 1914, H. S. Kerbaugh, Inc., contractor on Contract 63, asked the State Engineer that his contract be cancelled for the following main reasons:

1. Their original contract has long since expired (December 31, 1912).
2. Original contract price has increased from $2 to $3.4 million.
3. Prism excavation west of Irondequoit Trough cannot be completed as hydraulic dredge will not fit through temporary timber flume.
4. The State is not in a position to have certain items of work done at this time.

On August 4, 1914, the State Engineer submitted a letter to the Canal Board which contained in part the contractor's can-

cellation request, the principle items of work yet to be completed (mainly excavation and concrete prism lining), and reasons for delay of certain work items such as lack of railroad agreements and incomplete plans.

In addition, much more work than that covered by Contract 63 was now necessary and would take two or more years to complete. This additional work consisted of a new culvert, new embankment, new trough and possible new embankment treatment at the Cartersville Widewaters. The State Engineer believed that this could best be accomplished by incorporating the work in two or more new contracts, which should result in lower bid prices, and recommended that Contract 63 be terminated.

On August 25, 1914, the Canal Board agreed with the State Engineer's recommendation and cancelled Contract 63. Finishing up and some additional work continued, however, until December 29, 1914, when the final account was accepted as complete.

In 1914 and 1915, there was a long delay before a final decision was reached on the method of trough reconstruction. Meanwhile, plans for the new culvert and embankment were finalized, and it was important to get this work underway.

Superintendent of Public Works Authorization

By a Canal Board resolution dated October 19, 1915, the Superintendent of Public Works was authorized to perform or cause to be performed, the construction of a new culvert, embankment repair and of removing and reconstructing the whole or a portion of the timber flume.

However, there was no contract then in progress at or adjacent to the site of this work to which the work might be attached and it was impractical to award a contract for the work due to a lack of time. Therefore, the Superintendent of Public Works negotiated with Myers and McWilliams of Lancaster, Pennsylvania, for performing the work on a basis of cost plus a percentage.

Their plant was near the site of the work and they were able to start operations in November. Work continued through the winter and spring and up to June 16, 1916, when the culvert had been completed, the flume rebuilt and most of the embankment had been replaced. The remaining work was to be done by Contract 63-A which was by then in progress.

The new steel-reinforced, concrete culvert was 508 feet long and consisted of twin 9 foot high by 12 foot wide box culverts supported on wood piles. The remaining section of old Culvert #30, 50 feet east of the new one, was filled with compacted earth and sealed at each end and at three intermediate points by 1.5 foot thick concrete walls.

Some of the earth used in rebuilding the embankment was obtained by excavating the abandoned Erie Canal embankment that formed the east half of the "S" curve. This eliminated the basin between here and the west half of the Irondequoit Trough embank-

ment. Thus, the 700 foot long box culvert, which drained the basin, no longer served any function.

Contract 63-A Irondequoit Trough Repair

In August of 1917, repairs were started on the Irondequoit Trough under Contract 63-A. The replaced section of the Trough has a 6.5 foot high by 3 foot wide and 600 foot long inspection tunnel in both trough walls. The new floor (Alteration #2, July 1917) consisted of a 4 inch top slab, a ½ inch tar felt waterproofing membrane, an 8 inch middle slab, 12-24 inches of gravel and a 12 inch bottom slab. Any water that managed to leak through or around the membrane would travel down through the gravel, along the sloping bottom slab and enter the inspection tunnels where it could be monitored. The joints in the new walls were made watertight by imbedding a strip of sheet lead into each block as it was built.

The width between the vertical walls of the Irondequoit Trough is 96 feet. In the area of the replaced walls with the interior inspection tunnels, the replaced north wall is in line with the previous one, but the replaced south wall is set back an additional eight feet further than the previous one. Thus, there is a 600 foot long section of the trough where the width is 104 feet.

The reason for this additional width was that the temporary timber flume which spanned the breach was built adjacent to the south retaining wall. As originally planned, this flume was to be removed prior to wall reconstruction, but a decision was later made to maintain canal traffic during reconstruction. Therefore, it was necessary to move the south wall out eight feet to leave the sidewall supports for the flume in place. The junction walls could not be placed until the timber flume was removed during the Winter of 1917-18.

In early 1918, the progress of Contract 63-A was such as to indicate that the canal would not be ready for traffic on opening day, May 15. After due consideration, the contract was suspended on March 6, 1918, and the work completed under the direction of the Superintendent of Public Works. By using the contractor's equipment and bringing in additional machines, all work essential to navigation was completed in time, but minor work was left to be covered by a future contract.

Contract 63, 63-A and 201 Cartersville

The north embankment, built under Contract 41 between the west end of the Irondequoit Trough and the Cartersville Guard Gate, was strengthened by the addition of three feet of puddle (wet clay and possibly sand, mixed in place to render it watertight) by Contract 63, Alteration #3 (Nov. 1911). Under Alteration #11 (Feb. 1913), clay material was deposited on the bottom of the Cartersville Widewaters to prevent leakage. Then, under Alteration #13 (Feb. 1914), additional soil and clay were added to the Widewater side of the Erie Canal embankment to prevent seepage into the fields to the south and slides into the Widewaters. Also, clay and other material was added to the floor of the Widewaters.

In 1916, under Contract 63-A, a uniform canal prism was created by constructing a new south embankment which isolated the Cartersville Widewaters. Then the canal prism was lined with a 12 inch concrete slab from the end of the Irondequoit Trough to the Cartersville Guard Gate. However, just as the canal was about filled on the night of May 14, 1917, a 700 and a 300 foot long section of the south embankment slid into the canal and delayed navigation for two days. The slide caused the Cartersville Widewaters to reflood, but the water was retained by the old Erie Canal embankment. Under Alterations #2 (July 1917) and #3 (Feb. 1918), the Cartersville Widewaters was completely filled in with earth and the two south embankment sections rebuilt, but not relined with concrete due to this contract being suspended in March of 1918. Also, a 75 foot long section of the south slope adjacent to the old Cartersville Bridge failed and was also rebuilt with earth.

Then, under Contract 201 in 1919 and 1920, the three south bank sections were relined with 12 inch thick concrete slabs. However, the south bank, between the old Cartersville Bridge and the guard gate (where the Erie rejoined the Barge Canal alignment), was not lined with concrete. Thus, there is a 370 foot long prism section between these points where the south bank is lined with stone. This finally completed the lining of the canal from the east end of the Bushnell Basin Trough (present Interstate Route I-490 Bridge) to the Cartersville Guard Gate with a floor elevation above sea level of 448.4 feet.

In 1954, a leak occurred about 150 feet west (Station 2070) of the west end of the Bushnell Basin Trough. The toe of the north embankment sloughed and about 200 feet of 25 foot long steel sheet piling was driven through the tow path to cut off the leak.

Contracts M57-1 and M58-4 Concrete Repair

Since 1920, there have been only two contracts in the Bushnell Basin - Cartersville area for concrete repair and a few unrecorded isolated repairs by Canal Maintenance Forces. Both of these contracts were for repairs or replacement of the trough walls and concrete prism lining. Contract M57-1 (1957) was for repairs to the north side of the canal between I-490 and the west end of the Irondequoit Trough. Contract M58-4 (1958) was for repairs to the south side of the canal and both sides between the west end of the Irondequoit Trough and the Cartersville Guard Gate.

Of particular interest in Contract M57-1 was repair of the 468 foot long Bushnell Basin Retaining Wall. The eastern 360 feet (includes 47 foot wingwall) of this wall was to be repaired one-two feet deep in many places while the western 160 feet (includes 5 foot wingwall) was to be left alone. However, actual repairs were much more extensive and included one-two foot deep replacement of the whole eastern section and a four-six inch refacing of the western section. This explains why the eastern section of this wall is in very good condition.

In 1975, the exposed canal prism floor between the Bushnell Basin Trough was noted as being covered here and there with small thin patches of sprayed on concrete (shotcrete). Although the whole floor had been covered with shotcrete, practically all of it had been removed by the propeller wash of large boats. This work was also apparently done under Contract M57-1 or M58-4.

Two inch diameter holes through the shotcrete and prism floor indicated that grout (mixture of cement and water) had been pumped under the concrete floor slab. From the east end of the Bushnell Basin Trough to 400 feet west of the Trough, nearly 300 holes on 20 foot centers were drilled through the top slab of the canal floor. Grout was pumped into nearly 200 of the holes to form a 1-2 inch thick layer under the top slab. The 140 foot long, reinforced floor section over Culvert #29 was omitted. This work was done in 1965 by Regional Canal Maintenance Forces.

1975 Cartersville Inspection

Under Contract 201 in 1919 and 1920, the contractor was apparently allowed to leave those embankment slabs which slid into the canal in 1917 and other concrete debris on the canal floor. This was interpreted from two notes in the plans. One stated that "Old concrete slabs projecting within prism lines to be removed" and the other that "All points projecting above elevation 449.4 to be leveled." Since the concrete floor was at elevation 448.4, this gave the contractor the option of leaving one foot of material on the canal floor. This additional one foot of debris would not interfere with navigation as the concrete sill under the guard gates was at elevation 449.4.

In late August of 1975, this area between the Cartersville Guard Gate and the Irondequoit Trough was rediscovered and caused some immediate concern. Due to repairs at the Bushnell Basin

Concrete Prism Lining
Looking West From West End of Bushnell Basin Trough

Bushnell Basin Prism Floor
Loose shotcrete with grout hole through it and the prism floor.

Looking West-Cartersville Prism Lining
Note concrete slabs buried in 1-2 feet of mud and water.

Trough, the water level was now at its lowest level probably since 1919 and a number of concrete slabs were seen just protruding above the water, mud and among the weeds. The slabs were tilted and broken, and the canal bottom looked as if it had buckled and erupted due to extreme forces.

An inspection of this area was made in early September, just prior to the removal of an earth dam that had been placed against the east side of the Cartersville Guard Gate. (Right after the Bushnell Basin Trough collapsed, someone threatened to blow up the Cartersville Guard Gate and release the full head of water on the west side of the gate. The dam was immediately constructed as a precaution.) Broken slabs were found strewn over a 1000 foot long section of the canal floor, but they were only obvious in one short section where they just protruded. The rest were buried in the more than one foot deep mud and water. Since a number of the concrete slabs lining the sides of the canal prism had different construction joint spacing, it was then concluded that the slabs were originally part of the prism lining. How the slabs came to be left on the canal floor was not learned until months later when Contract 201 was closely examined.

Another unusual condition was also noted during this inspection. The concrete canal floor throughout this area was originally constructed at elevation 448.4, but only at the west end of the Irondequoit Trough was the canal floor dry. Between here and the Cartersville Guard Gate sill, the canal floor was

Looking East-West End of Irondequoit Trough
Note how dry floor is compared to 1-2 feet of
mud and water in Cartersville Prism Lining.

covered with a layer of one to two foot deep mud and pooled water. Thus, the floor of the Cartersville prism lining is lower than elevation 448.4, which means that this area must have settled. Undoubtedly, the settlement was due to the placement of unsuitable material and clay under this section of the canal when the Cartersville Widewaters existed. However, no problems are presently associated with this settlement.

<u>Contract M75-2 Bushnell Basin Trough Repair</u>

In the afternoon of October 29, 1974, the concrete floor of the Bushnell Basin Trough collapsed into a five foot diameter sewer tunnel being constructed under the canal by the Greenfield Construction Company for the Irondequoit Bay Pure Waters Authority.

Looking East-Bushnell Basin Trough
Day after floor collapsed.

Although the Bushnell Basin and Cartersville Guard Gates were quickly closed, considerable damage occurred to a number of homes in the immediate downstream area. The break occurred near the center of the trough and left an approximate 90 foot by 100 foot hole in the floor. Amazingly, both concrete retaining walls remained in place, although they had no bottom support for over 120 feet. Due to this dangerous condition, they were soon blasted down with dynamite. Subsequently, seven 30 foot long retaining wall sections were removed from each side of the canal trough to permit repair of a 250 foot long section of the trough and embankment.

Under Contract 63 in 1914, Culvert #29 was reduced in size by the insertion of a 4 foot diameter cast iron pipe inside the old 6 foot wide by 5 foot high stone block arch. Although the area in between was filled with concrete, Culvert #29 did leak slowly at the joints as noted by rust stains and mineral deposits. This culvert was now located adjacent to the break in the trough and most of the reinforced trough floor over it had collapsed into the hole. Since the culvert was undersize, leaked and could be disturbed by reconstruction, the decision was made to replace it with a new 84 inch diameter concrete pipe.

The new Culvert #29 was located approximately 70 feet east of the old one, while the 36 inch diameter concrete encased sewer, whose original construction resulted in the collapse, was located approximately 13 feet east and 6 feet lower than the new culvert. When the new culvert was complete, the old one was completely plugged with concrete.

An open top concrete box, with two 30 inch diameter holes, surrounds the entrance of the new culvert. This is meant to limit the amount of water passing through, except during flood conditions.

Reconstruction of the trough floor and walls was essentially the same design as the original construction, but modern techniques and materials were used. The number of joints in the floor slabs was minimized by using reinforcing steel, synthetic (man-made)

rubber sealers were used in joints and plastic waterstops across joints to make them leakproof, and a synthetic waterproofing membrane was used to prevent the bottom slab from leaking.

While reconstruction progressed, the water table was kept low in the area by using a series of well-points (small pipes with strainers on the ends inserted deep in the ground) to pump out the water. When reconstruction was nearly complete and the well-points had been withdrawn for about two weeks, water was seen leaking through numerous joints into the new 84 inch culvert as the canal was being refilled. However, no one had been in the culvert prior to refilling to note if it leaked then.

Only the bottom half of the new culvert had been encased in concrete and the joints sealed with a material that had the consistency of thick grease. Therefore, not much water pressure was needed for the water to soon force its way through the joint sealer. This occurred mainly in the lower 1/3 of the culvert toward the middle and lower end. The leaks were easily distinguished by a white residue which coated the joint area. This white residue was also noticed at the downstream end of the culvert where water was coming out from under large rocks.

Samples of all the readily available water sources, including the canal, were tested in the laboratory to try and find the source of the leaks. Since no two matched, it was concluded that the water was from the existing high water table or an underground spring in this location which moved upward again when the well-points were removed. The leaks had undoubtedly occurred prior to canal refilling, but not noticed until after refilling.

Laboratory tests on the white residue showed this to be a carbonate substance. Since practically the whole breach area had been refilled with a well-graded (very small to large size particles) crushed limestone, which is a carbonate rock, this substance was rock dust being washed out of the embankment. Although limestone is capable of being dissolved by acidic water, the rate at which this will occur at this location was estimated to be extremely slow as the water is basic.

Those joint areas in the culvert which leaked were cleaned out and packed with a fast setting concrete mortar (mixture of sand and cement) to plug the leaks. All reconstruction work for repair of the Bushnell Basin Trough, except for the bottom of the embankment and sewer installation, was done under Contract M75-2 in 1975. The canal was reopened to traffic on September 18, 1975.

Contract No. 41

Erie Canal — Section 9

At Irondequoit Creek Crossing.

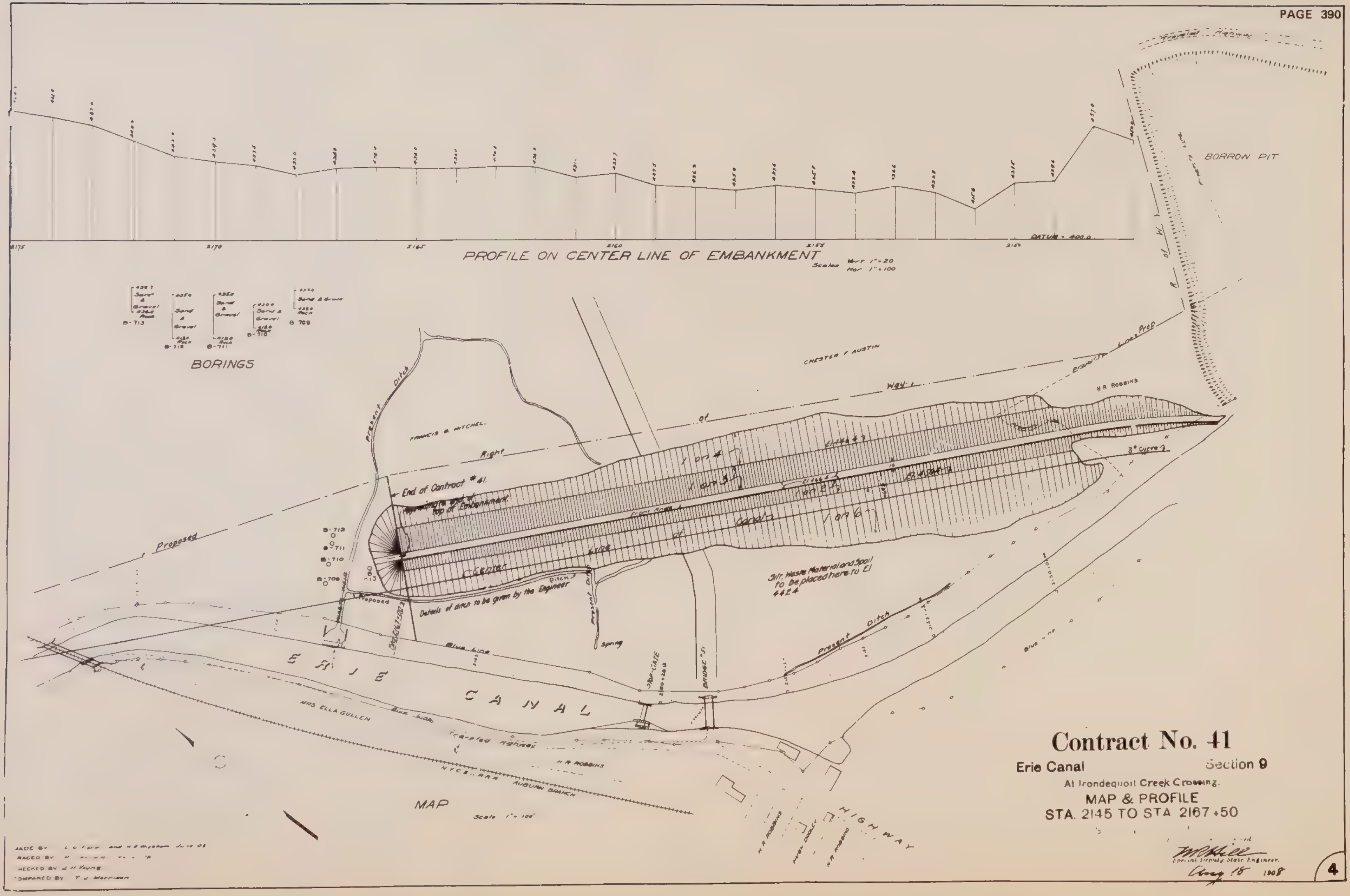
LOCATION MAP

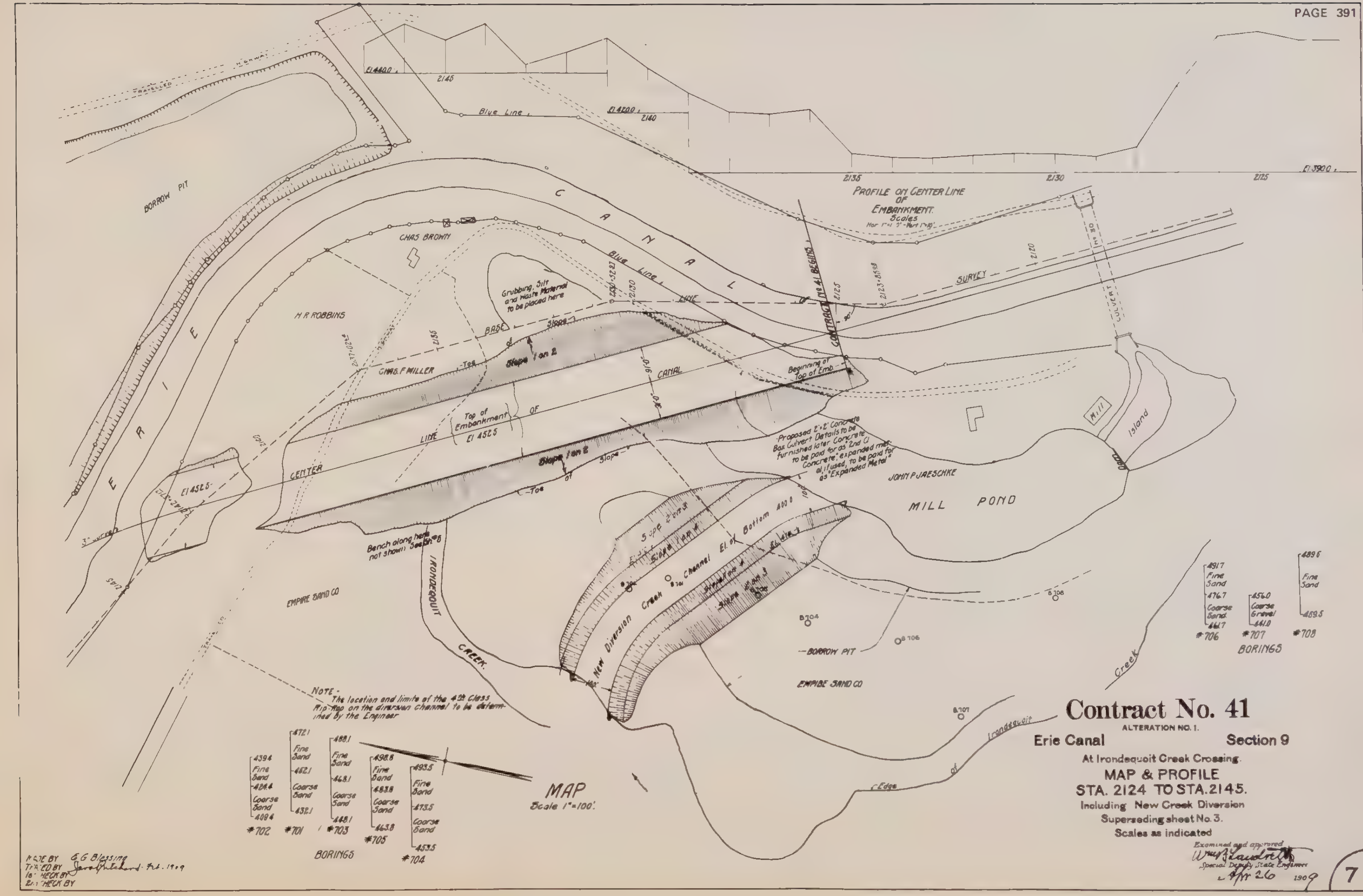
Scale: 200 feet to the inch

Examined and appr.
Special Deputy State E.
Aug 18 .8

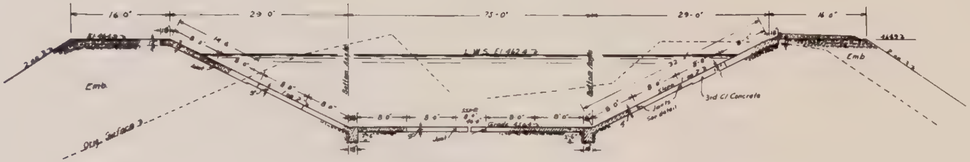
MADE BY J. H. Young June 1908
TRACED BY G. Fisher June 30 1908
CHECKED BY G. Fisher July 1, 1908

2

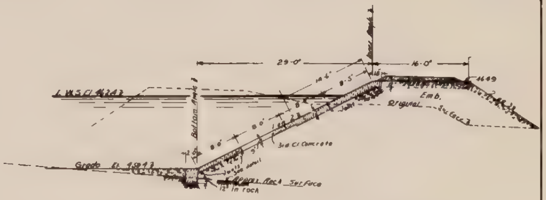

PROFILE ON CENTER LINE OF EMBANKMENT
BORROW PIT
DATUM - 400.0
BORINGS
CHESTER F AUSTIN
FRANCIS & MITCHEL
H R ROBBINS
End of Contract # 41.
Approximate end of top of Embankment
Proposed
Right of Way
Center Line of Canal
Present Ditch
Details of ditch to be given by the Engineer
Silt, Waste Material and Spoil to be placed here to El 442.4
3° Curve
Blue Line
Spring
E R I E C A N A L
MRS ELLA GULLEN
Traveled Highway
H R ROBBINS
N Y C & H R R R AUBURN BRANCH
HIGHWAY
MAP
Contract No. 41
Erie Canal
Section 9
At Irondequoit Creek Crossing.
MAP & PROFILE
STA. 2145 TO STA. 2167+50
Special Deputy State Engineer.
Aug 15 1908
4



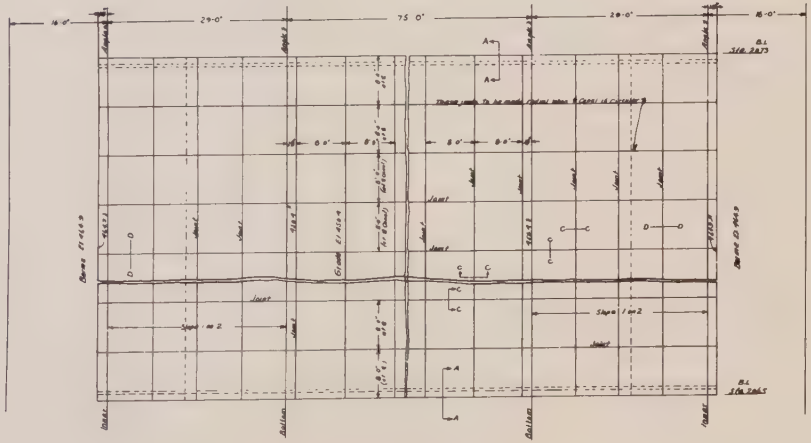
Contract No. 41
ALTERATION NO. 1.
Erie Canal
Section 9
At Irondequoit Creek Crossing.
MAP & PROFILE
STA. 2124 TO STA. 2145.
Including New Creek Diversion
Superseding sheet No. 3.
Scales as indicated
PROFILE ON CENTER LINE OF EMBANKMENT
MAP
Scale 1"=100'.
ERIE CANAL
BORROW PIT
CHAS BROWN
H R ROBBINS
CHAS F MILLER
JOHN P JAESCHKE
MILL POND
EMPIRE SAND CO
IRONDEQUOIT CREEK
New Diversion Creek Channel
Grubbing, Silt and Waste Material to be placed here
Top of Embankment El 452.5
CENTER LINE OF CANAL
Blue Line
SURVEY LINE
Beginning of Top of Emb.
Bench along here not shown See Sht. 8
NOTE - The location and limits of the 4th Class Rip-Rap on the diversion channel to be determined by the Engineer
BORINGS
Island
Mill
Edge of Irondequoit Creek
7



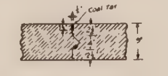
Typical Cross Section
B L Sta 2065 to Sta 2073
1" = 8'



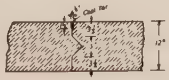
Typical Cross Section
B L Sta 1840 to Sta 1842 North Bank Only



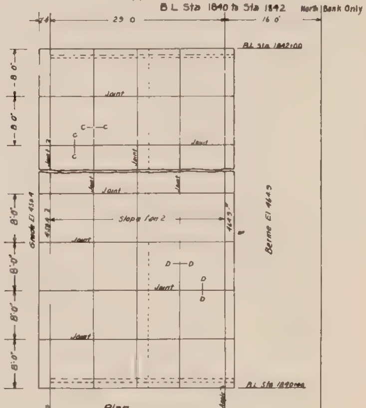
Plan
1" = 8'



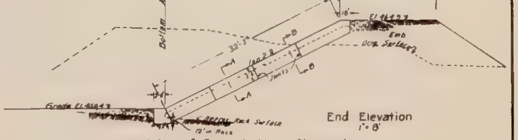
Section C-C Through Joint
1" = 1'0"



Section D-D Through Joint
1" = 1'0"

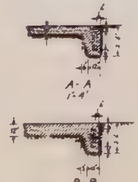


Plan
1" = 8'



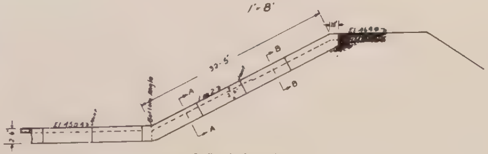
End Elevation
1" = 8'

Details of Concrete Lining Sta 1840 to 1842 B.L. North Bank



A-A
1" = 4'

B-B
1" = 4'



Half End Elevation
1" = 8'

Details of Concrete Lining Sta 2065 to 2073 BL

Note:-
All concrete shown on this sheet to be third class.
All unsatisfactory material in the foundation to be removed and replaced by material satisfactory to the Engineer and all material to be thoroughly compacted before concrete is laid.
All Joints to be provided with keys and made waterproof with coal tar as shown on the plans.
Where the center line of canal is circular the cross joints are to be made radial and 8'-0" c. to c. at the center line of the canal.
The exact locations and extent of concrete lining shall be altered if so ordered by the Engineer in writing.

BUSHNELLS BASIN

Contract No. 63.

Erie Canal — Section 9

Between west line of Wayne County and Kings Bend.

DETAILS OF CONCRETE LINING OF PRISM

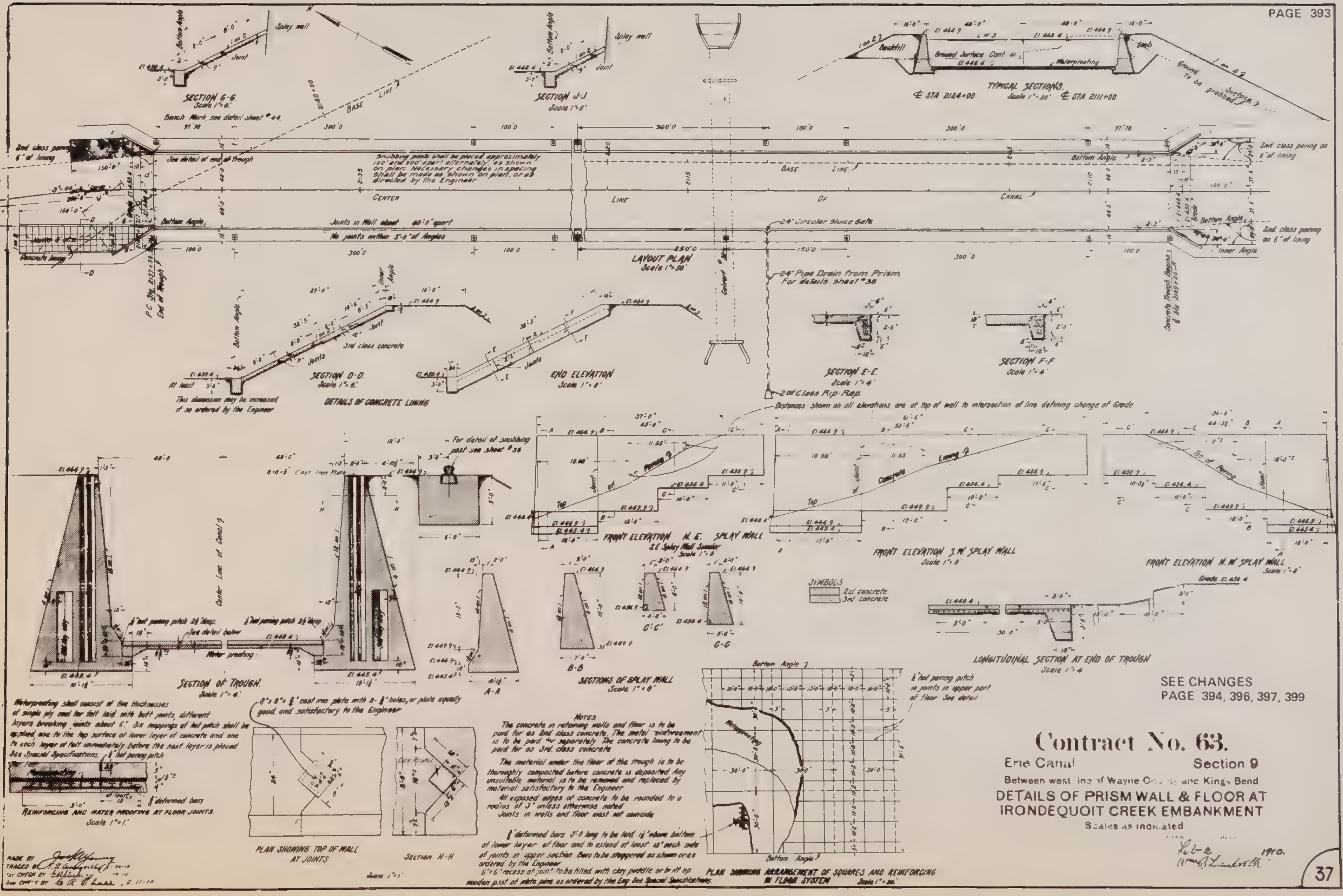
Scales as indicated

SEE CHANGES
PAGE 395, 398

Examined and approved
Wm. B. Landreth
Special Deputy State Engineer.
Nov 13 1909

34

MADE BY
TRACED BY Roberts
CHECK BY
2nd. CHECK BY 11-11-09



SEE CHANGES
PAGE 394, 396, 397, 399

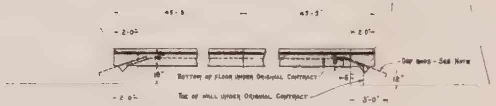
Contract No. 63.

Erie Canal — Section 9

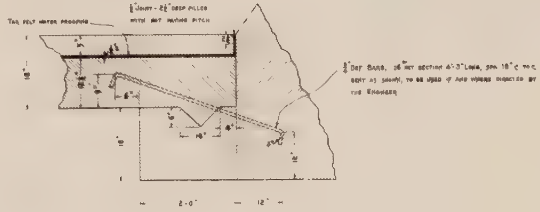
Between west line of Wayne County and Kings Bend

DETAILS OF PRISM WALL & FLOOR AT IRONDEQUOIT CREEK EMBANKMENT

Scales as indicated



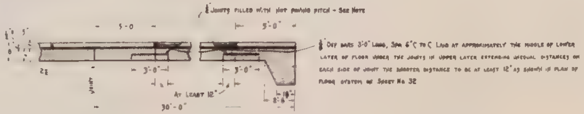
SECTION THROUGH TROUGH
SCALE 1" = 4'-0"



SECTION SHOWING CONNECTION OF FLOOR TO WALL
SCALE 1" = 1'-0"

CHANGES IN THE INNER TOES OF WALLS SHOWN ON THIS SHEET NOT TO AFFECT THAT PORTION OF WALL PLACED PRIOR TO THE DATE OF THIS ALTERATION

WATER PROOFING SHALL CONSIST OF 5 THICKNESSES WHOLE-PLY COAL TAR FELT LAID WITH BUTT JOINTS, DIFFERENT LAYERS BREAKING JOINTS ABOUT 8". SIX MOPPINGS OF HOT PITCH SHALL BE APPLIED ONE TO THE TOP SURFACE OF LOWER LAYER OF CONCRETE AND ONE TO EACH LAYER OF FELT IMMEDIATELY BEFORE THE NEXT LAYER IS PLACED. SEE SPECIAL SPECIFICATIONS



LONGITUDINAL SECTION ON ℄ ON ENDS OF FLOOR.
SCALE 1" = 4'-0"

THE UPPER 2½" OF JOINTS IN TOP LAYER OF FLOOR TO BE ½" WIDE AND FILLED WITH HOT PAVING PITCH.
ALL DETAILS SHOWN ON THIS SHEET SHALL SUPERSEDE THOSE SHOWN ON ORIGINAL CONTRACT PLANS. FOR OTHER DETAILS SEE SHEETS No 29 AND 32
A. MASONRY SHOWN ON THIS SHEET TO BE SECOND CLASS CONCRETE

SEE CHANGES
PAGE 396, 397

Contract No. 63.

ALTERATION NO 2

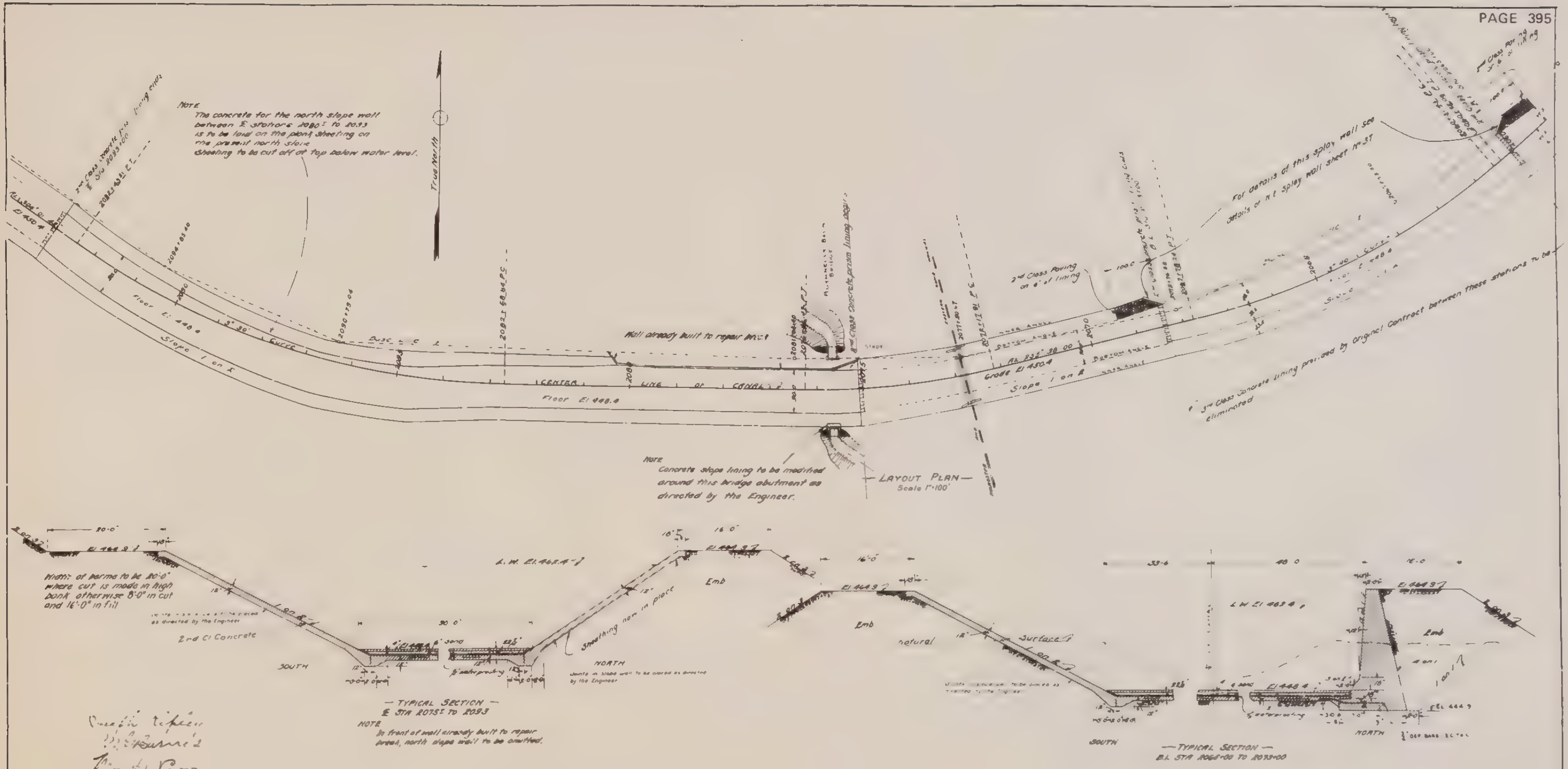
Erie Canal — Section 9

DETAILS OF CHANGES IN PRISM WALLS & FLOOR AT IRONDEQUOIT CREEK EMBANKMENT, STA. 2109 TO STA. 2137+59.33

Scales as indicated

Examined and approved
September 20, 1911
Special Deputy State Engineer

MADE BY
TRACED BY
1ST CHECK BY
2ND CHECK BY



All masonry shown on this plan to be second class concrete.

The upper 4" layer of concrete in floor is to be divided by joints into sections approximately 10' square. Lower layer 30' squares

Joints in wall and floor must not coincide.

For detail of reinforcement in floor see sheet No 144.

For detail of end of floor see sheet No 144.

All details not shown to be furnished by the Engineer.

For general plan of joints see sh. no 37

End of floor to be protected by bags of sand or as determined by the Engineer

SEE CHANGES PAGE 398

C.L.STA. 2059+05 TO 2069+30

Contract No. 63.

ALTERATION NO 3

Erie Canal — Section 9

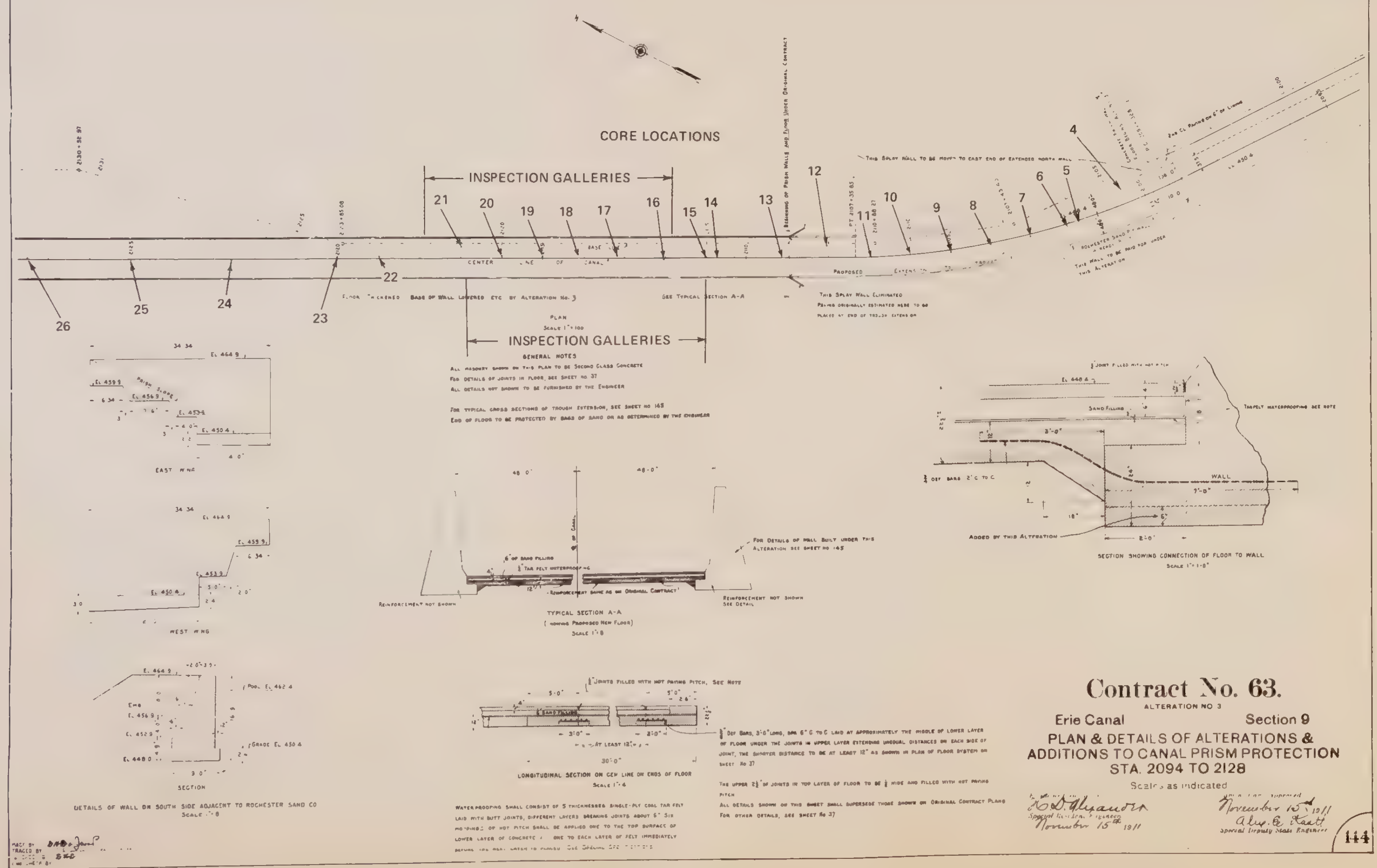
PLAN & DETAILS OF ALTERATIONS & ADDITIONS TO CANAL PRISM PROTECTION STA. 2059 TO 2094

Scales as indicated

Examined and approved — Special Resident Engineer

Examined and approved November 15th 1911 — Special Deputy State Engineer

MADE BY
TRACED BY
1st CHECK BY



Contract No. 63.

ALTERATION NO 3

Erie Canal — Section 9

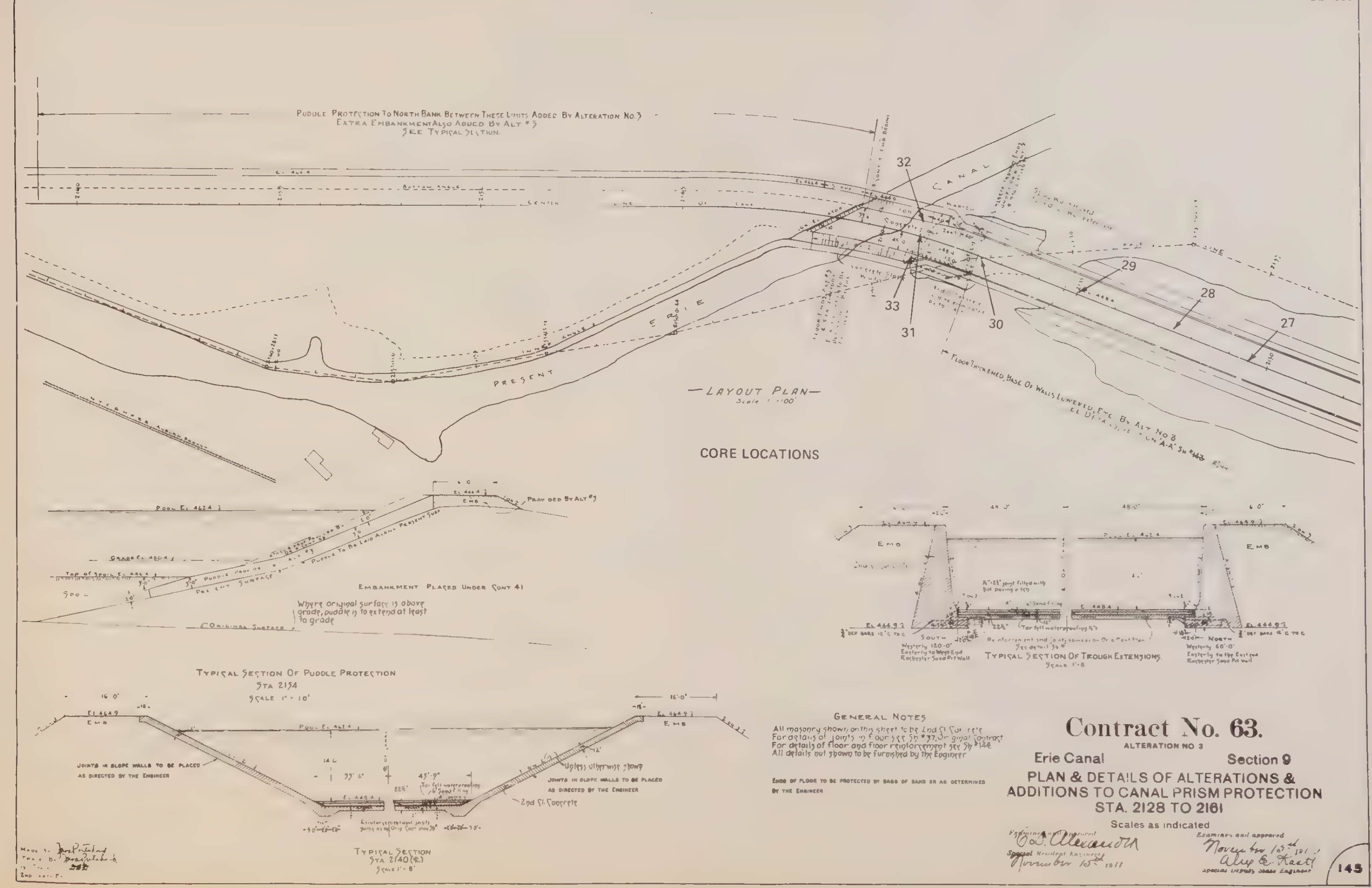
PLAN & DETAILS OF ALTERATIONS & ADDITIONS TO CANAL PRISM PROTECTION STA. 2094 TO 2128

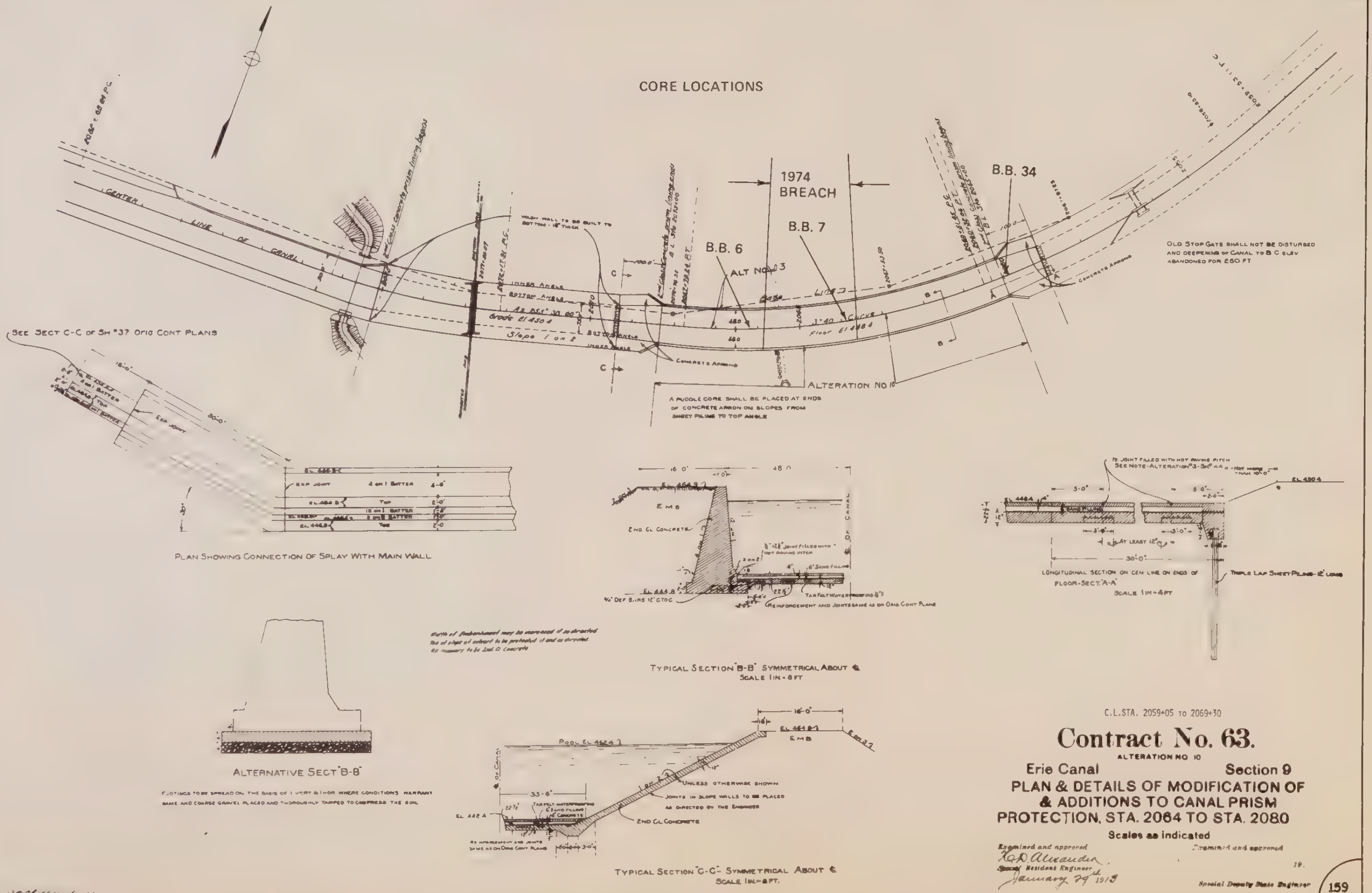
Scales as indicated

November 15th 1911

Special Deputy State Engineer

144


Puddle Protection To North Bank Between These Limits Added By Alteration No. 3
Extra Embankment Also Added By Alt # 3
See Typical Section.
Canal
Erie
Present
32
33
31
30
29
28
27
— Layout Plan —
Floor Thickened, Base Of Walls Lowered, Etc By Alt No 3
CORE LOCATIONS
Pool El. 462.4
Provided By Alt # 3
Emb
Embankment Placed Under Cont 41
Where original surface is above grade, puddle is to extend at least to grade
Original Surface
Typical Section Of Puddle Protection
Sta 2154
Scale 1" = 10'
Typical Section Of Trough Extensions.
South
North
Emb
General Notes
All masonry shown on this sheet to be 2nd Cl. Concrete
For details of joints in floor see Sh # 37, Original Contract
For details of floor and floor reinforcement see Sh # 144.
All details not shown to be furnished by the Engineer
Ends of floor to be protected by bags of sand or as determined by the Engineer
Joints in slope walls to be placed as directed by the Engineer
Unless otherwise shown
2nd Cl. Concrete
Typical Section
Sta 2140 (℄)
Contract No. 63.
Alteration No 3
Erie Canal
Section 9
PLAN & DETAILS OF ALTERATIONS & ADDITIONS TO CANAL PRISM PROTECTION
STA. 2128 TO 2161
Scales as indicated
Examined and approved
Special Resident Engineer
November 15th 1911
Examined and approved
November 15th 1911
Special Deputy State Engineer
143



C.L.STA. 2059+05 TO 2069+30

Contract No. 63.

ALTERATION NO 10

Erie Canal — Section 9

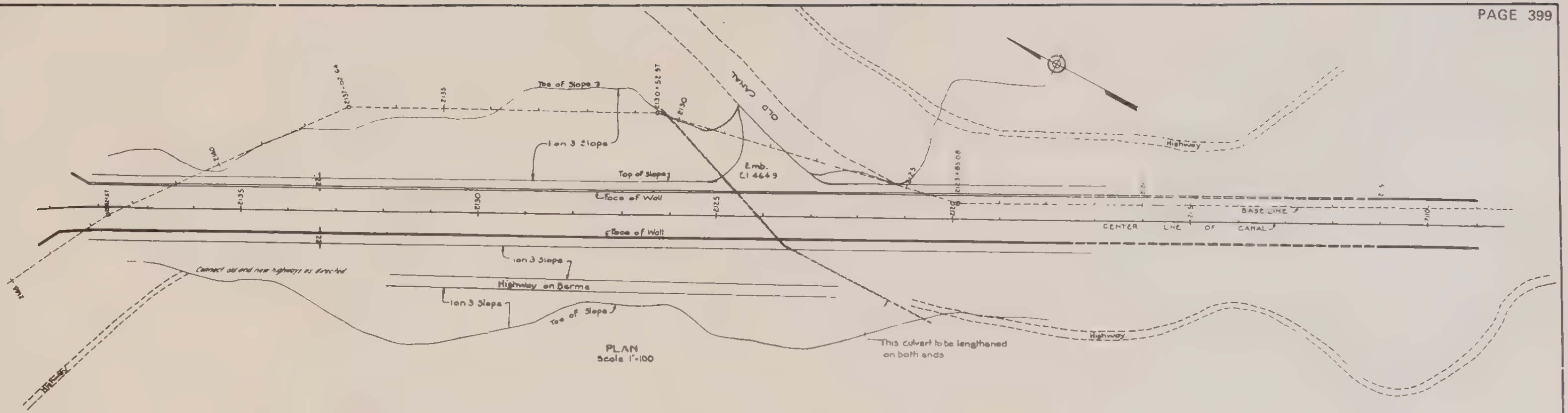
PLAN & DETAILS OF MODIFICATION OF & ADDITIONS TO CANAL PRISM PROTECTION, STA. 2064 TO STA. 2080

Scales as indicated

Examined and approved
H. D. Alexander
Resident Engineer
January 29th 1913

Examined and approved
19
Special Deputy State Engineer

MADE BY D. B. Chapple
CHECK BY R. J. Knapp



PLAN
Scale 1" = 100

GENERAL
—NOTES—

Bank of canal on north and south sides to be widened to width of 22' with side slopes of 1 on 3 from B.L. Sta 2122 ± to 2143±, as directed by the Engineer except as shown on typical section Sta 2133 below highway on berme along south bank to be raised and graded as directed by the Engineer.

Outside 3 of embankments to consist of gravelly material unless otherwise directed by the Engineer.

Top of all embankments to be graded to slope away from canal.

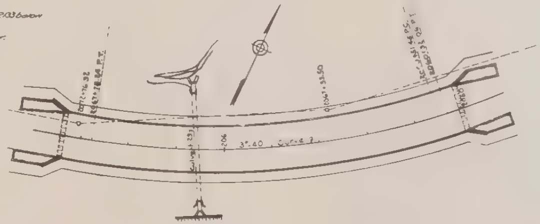
Under this alteration material of a clayey nature is to be deposited in Centerville wide water B.L. Sta 2130± to B.L. Sta. 2172± as directed by the Engineer, to prevent leakage.

East of break in trough the north and south embankments are to be graded as directed by the Engineer.

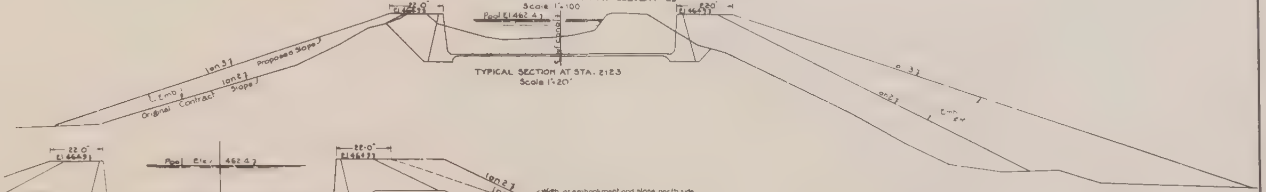
At west end of trough material washed out at time of break to be replaced by puddle and north and south embankments are to be widened as directed by the Engineer.

Exact limits of additional embankment to be determined by the Engineer.

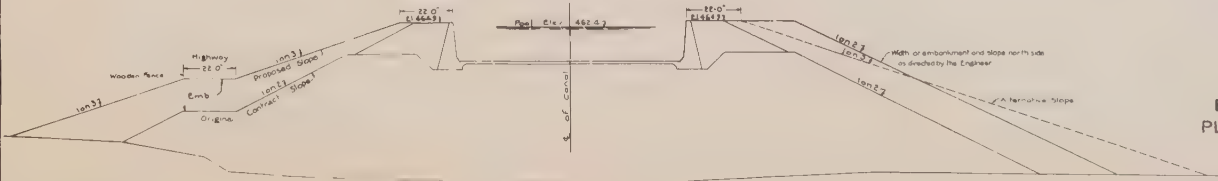
Note
... pool on North and South side of canal from B.L. Sta 2065 to B.L. Sta. 2073 to be graded as directed by the Engineer.
Culvert 29 to be lengthened on North and South ends. Plans to be furnished by the Engineer.



PLAN OF CONCRETE TROUGH AT CULVERT 29
Scale 1" = 100



TYPICAL SECTION AT STA. 2123
Scale 1" = 20'



TYPICAL SECTION AT STA. 2133
Scale 1" = 20'

Contract No. 63.

ALTERATION NO. 11

Erie Canal — Section 9

PLANS & SECTION FOR REINFORCING BANKS OF CANAL AT IRONDEQUOIT CREEK

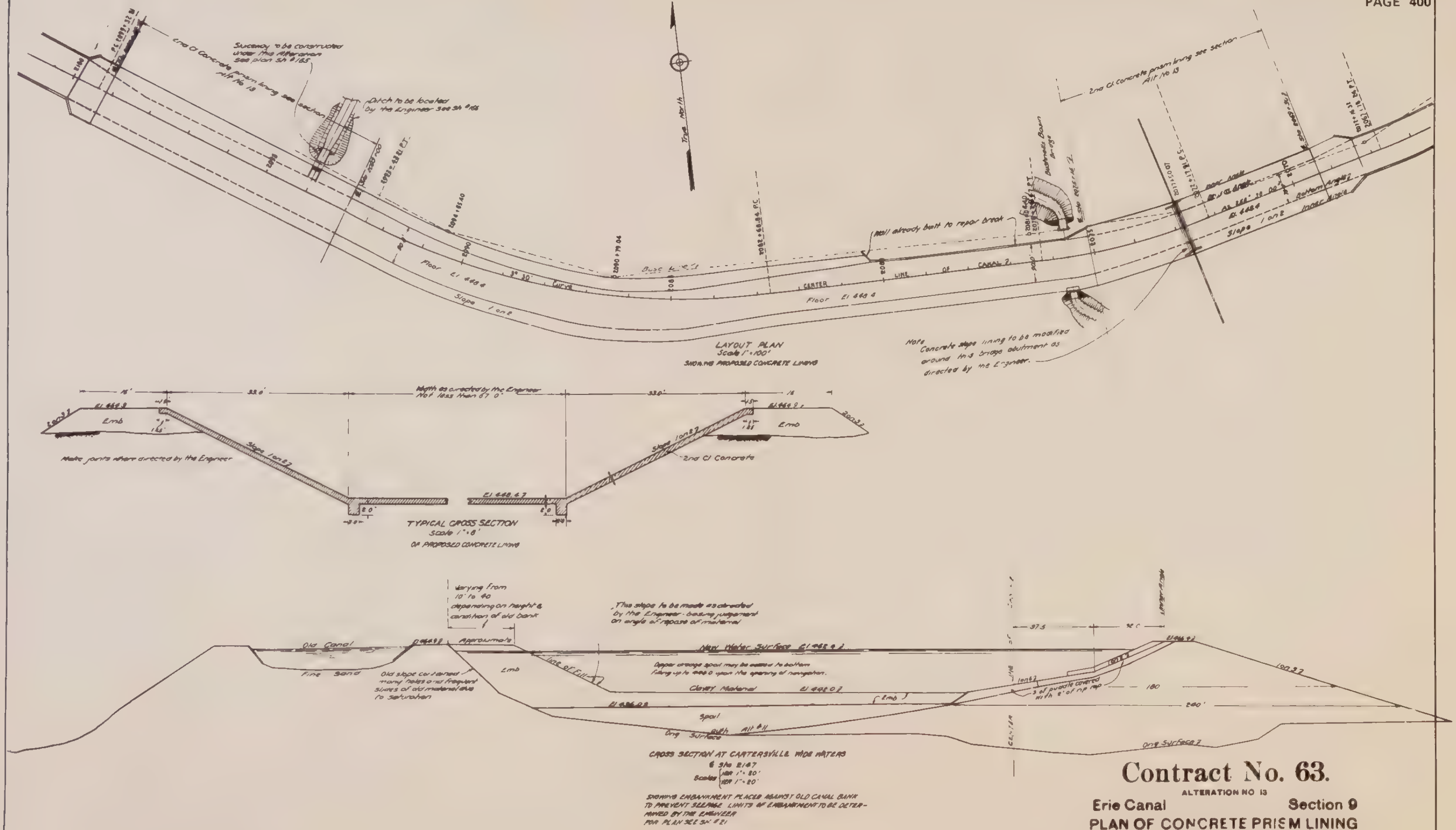
Scales as indicated

MADE BY
TRACED BY W.J. Hunt
1ST CHECK BY
2ND CHECK BY

Examined and approved
H. D. Alexander
February 21st 1913.

Examined and approved
February 21, 1913
Alex. E. Kastl
Deputy State Engineer

160



Contract No. 63.

ALTERATION NO 13

Erie Canal — Section 9

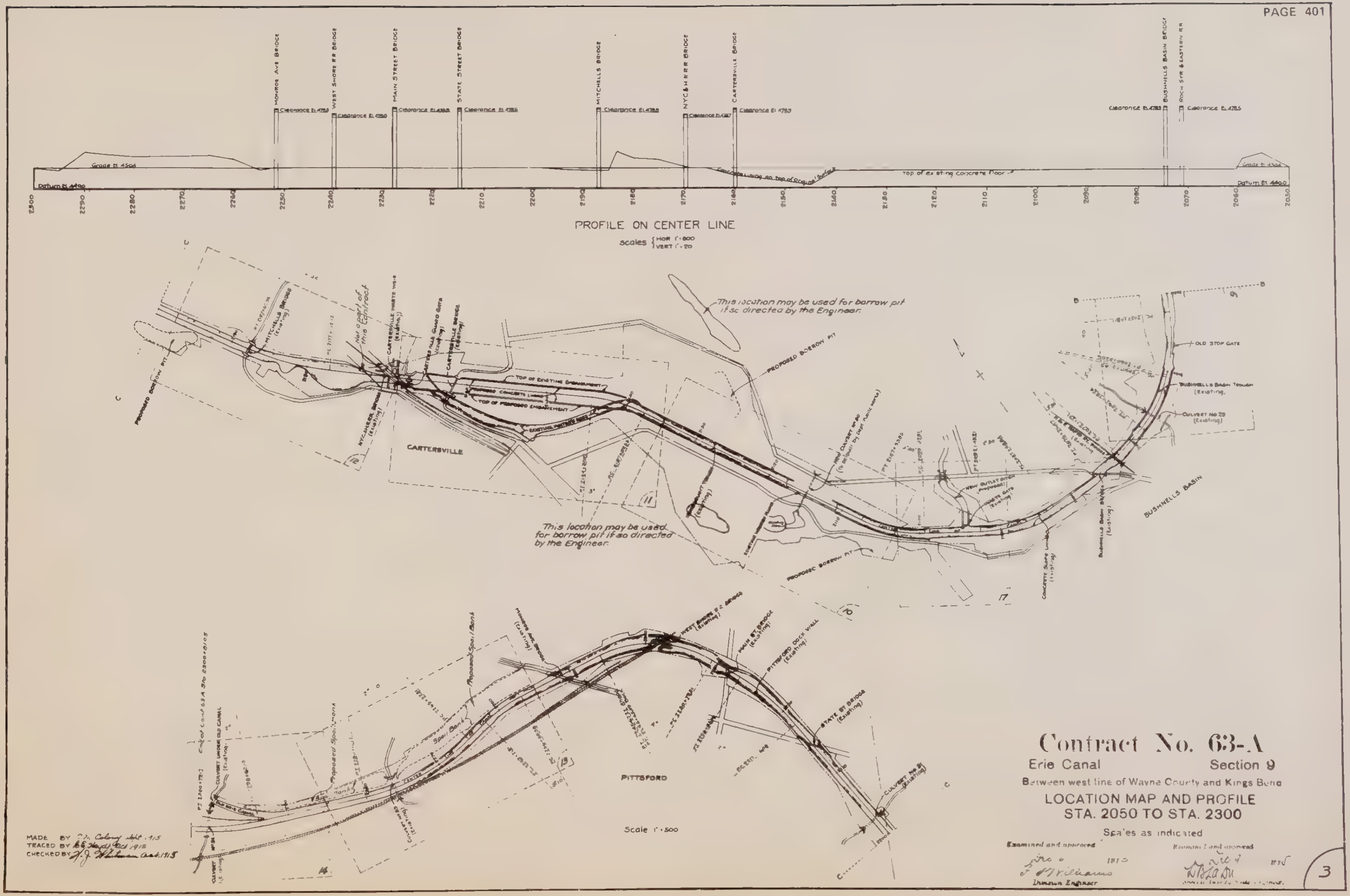
PLAN OF CONCRETE PRISM LINING
STA. 2069 +30 TO 2075 +15 &
STA. 2093 +00 TO 2099 +15

Scales as indicated

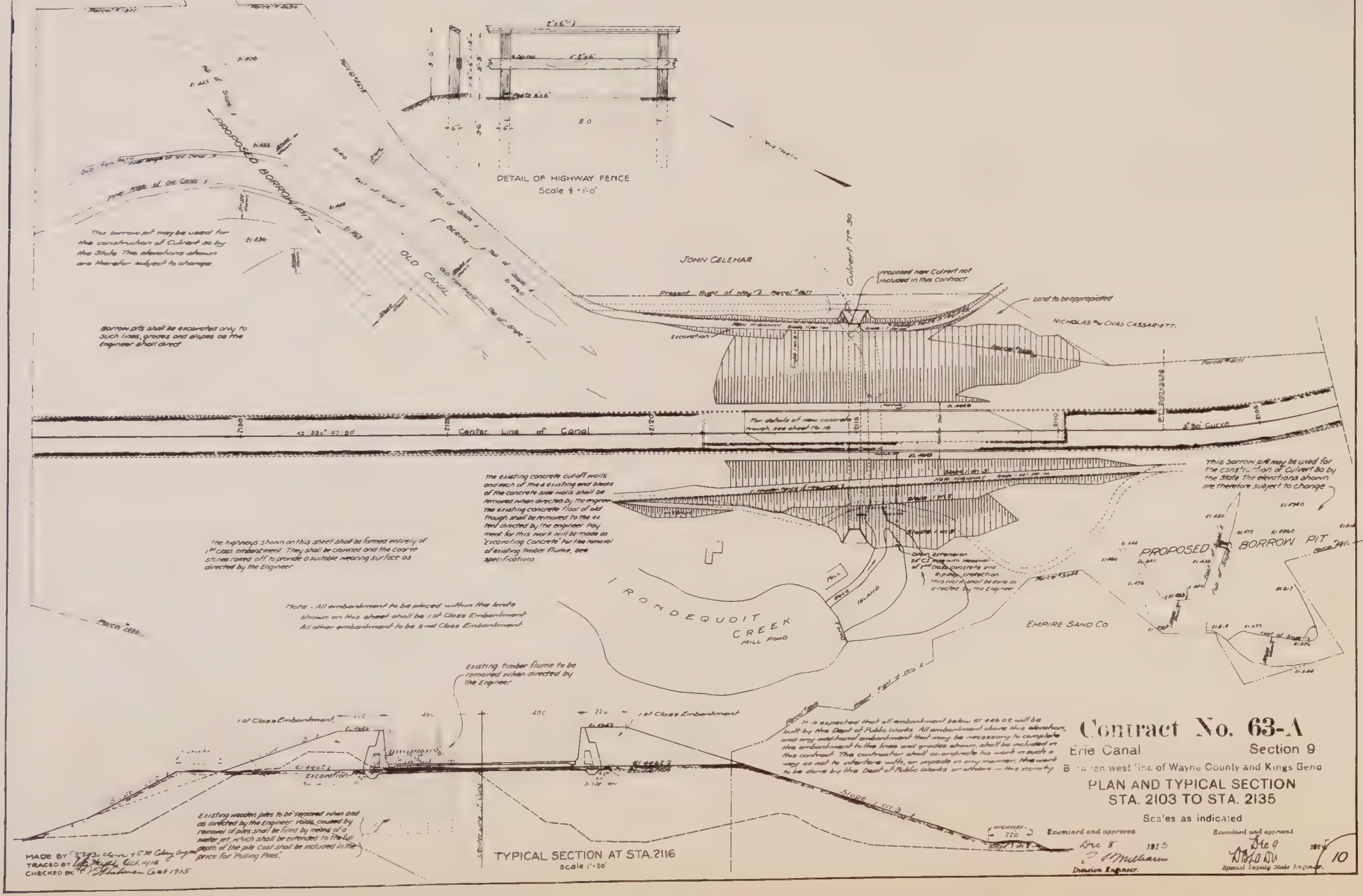
Examined and approved
H.O. Alexander
Special Resident Engineer
February 3rd 1914

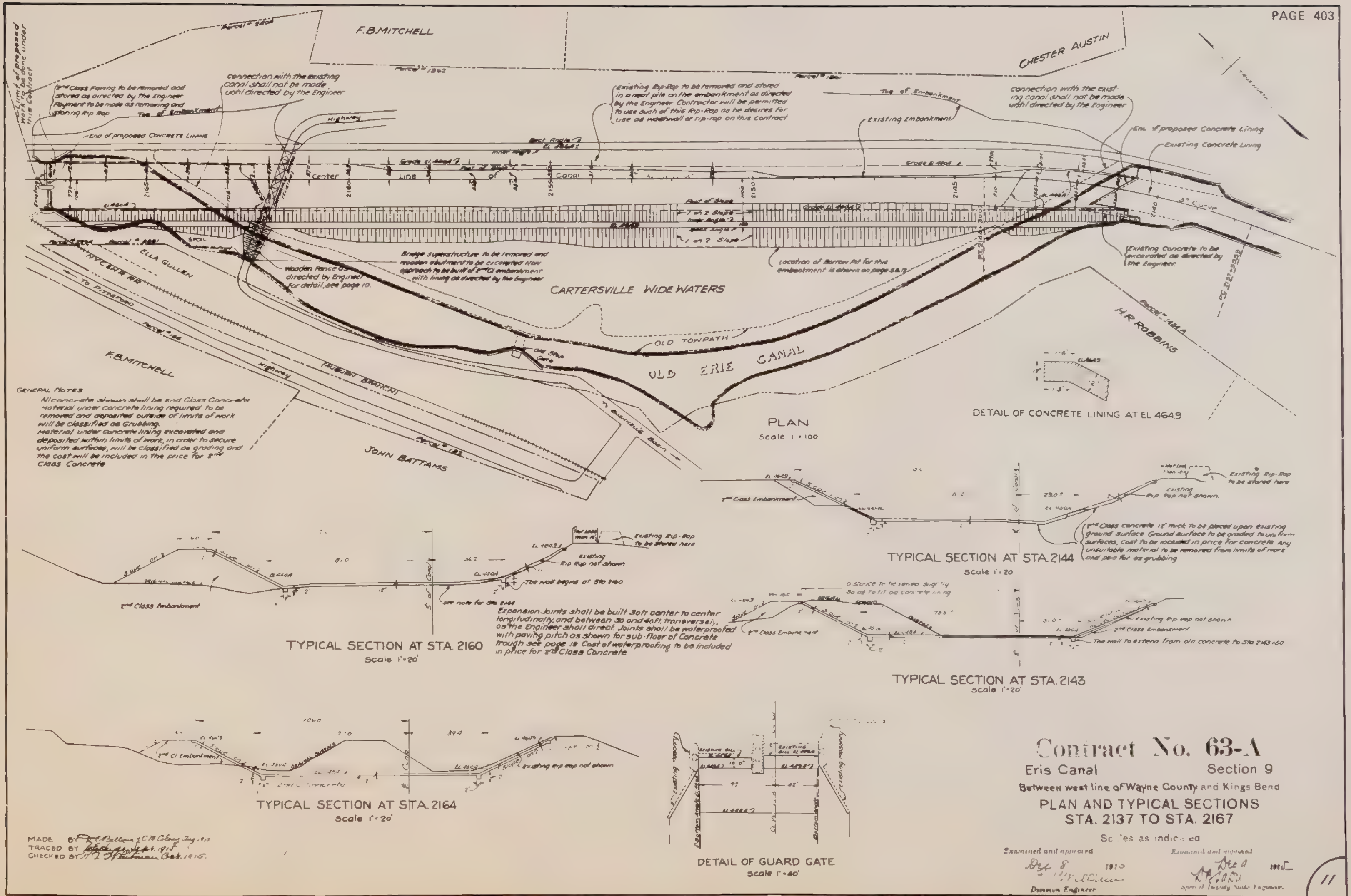
Examined and approved
February 3, 1914
Alex E. Kastl
Special Deputy State Engineer

164



MONROE AVE BRIDGE
WEST SHORE RR BRIDGE
MAIN STREET BRIDGE
STATE STREET BRIDGE
MITCHELLS BRIDGE
NYC & H R RR BRIDGE
CARTERSVILLE BRIDGE
BUSHNELLS BASIN BRIDGE
ROCH SYR & EASTERN RR
Grade El 450.4
Datum El 440.0
Top of existing concrete floor
PROFILE ON CENTER LINE
scales { HOR 1"=800 VERT 1"=20
This location may be used for borrow pit if so directed by the Engineer.
PROPOSED BORROW PIT
CARTERSVILLE
Not a part of this contract
OLD STOP GATE
BUSHNELLS BASIN
This location may be used for borrow pit if so directed by the Engineer.
PITTSFORD
Spoil Bank
Proposed Spoil Bank
PITTSFORD DOCK WALL (Existing)
STATE ST BRIDGE (Existing)
Scale 1"=500
MADE BY
TRACED BY
CHECKED BY
Contract No. 63-A
Erie Canal
Section 9
Between west line of Wayne County and Kings Bend
LOCATION MAP AND PROFILE
STA. 2050 TO STA. 2300
Scales as indicated
Examined and approved
Division Engineer
3


DETAIL OF HIGHWAY FENCE
Scale ¼" = 1'-0"
PROPOSED BORROW PIT
OLD CANAL
This borrow pit may be used for the construction of Culvert 90 by the State. The elevations shown are therefore subject to change.
Borrow pits shall be excavated only to such lines, grades and slopes as the Engineer shall direct
JOHN CELEHAR
Culvert No 90
Proposed new Culvert not included in this Contract
Present Right of Way
Land to be appropriated
NICHOLAS and CHAS CASSARIETTI
Excavation
New Highway
Center Line of Canal
For details of new concrete trough, see sheet No. 16
Curve
This borrow pit may be used for the construction of Culvert 90 by the State. The elevations shown are therefore subject to change.
The existing concrete cut-off walls and each of the 4 existing end blocks of the concrete side walls shall be removed when directed by the Engineer. The existing concrete floor of old trough shall be removed to the extent directed by the Engineer. Payment for this work will be made as "Excavating Concrete". For the removal of existing timber flume, see specifications
The highways shown on this sheet shall be formed entirely of 1st class embankment. They shall be crowned and the coarse stones raked off to provide a suitable wearing surface as directed by the Engineer.
Note - All embankment to be placed within the limits shown on this sheet shall be 1st Class Embankment. All other embankment to be 2nd Class Embankment.
IRONDEQUOIT CREEK
MILL POND
ISLAND
PROPOSED BORROW PIT
EMPIRE SAND CO
Existing timber flume to be removed when directed by the Engineer
1st Class Embankment
Excavation
Slope 1 on 3
Existing wooden piles to be removed when and as directed by the Engineer. Voids caused by removal of piles shall be filled by means of a water jet, which shall be extended to the full depth of the pile. Cost shall be included in the price for "Pulling Piles".
TYPICAL SECTION AT STA. 2116
Scale 1" = 20'
It is expected that all embankment below El 446.02 will be built by the Dept of Public Works. All embankment above this elevation, and any additional embankment that may be necessary to complete the embankment to the lines and grades shown, shall be included in this contract. The contractor shall co-ordinate his work in such a way as not to interfere with, or impede in any manner, the work to be done by the Dept of Public Works or others in the vicinity.
Contract No. 63-A
Erie Canal
Section 9
Between west line of Wayne County and Kings Bend
PLAN AND TYPICAL SECTION
STA. 2103 TO STA. 2135
Scales as indicated
Examined and approved
Dec 8 1915
Division Engineer.
Examined and approved
Dec 9
Special Deputy State Engineer.
10
MADE BY
TRACED BY
CHECKED BY



Contract No. 63-A

Erie Canal — Section 9

Between west line of Wayne County and Kings Bend

PLAN AND TYPICAL SECTIONS
STA. 2137 TO STA. 2167

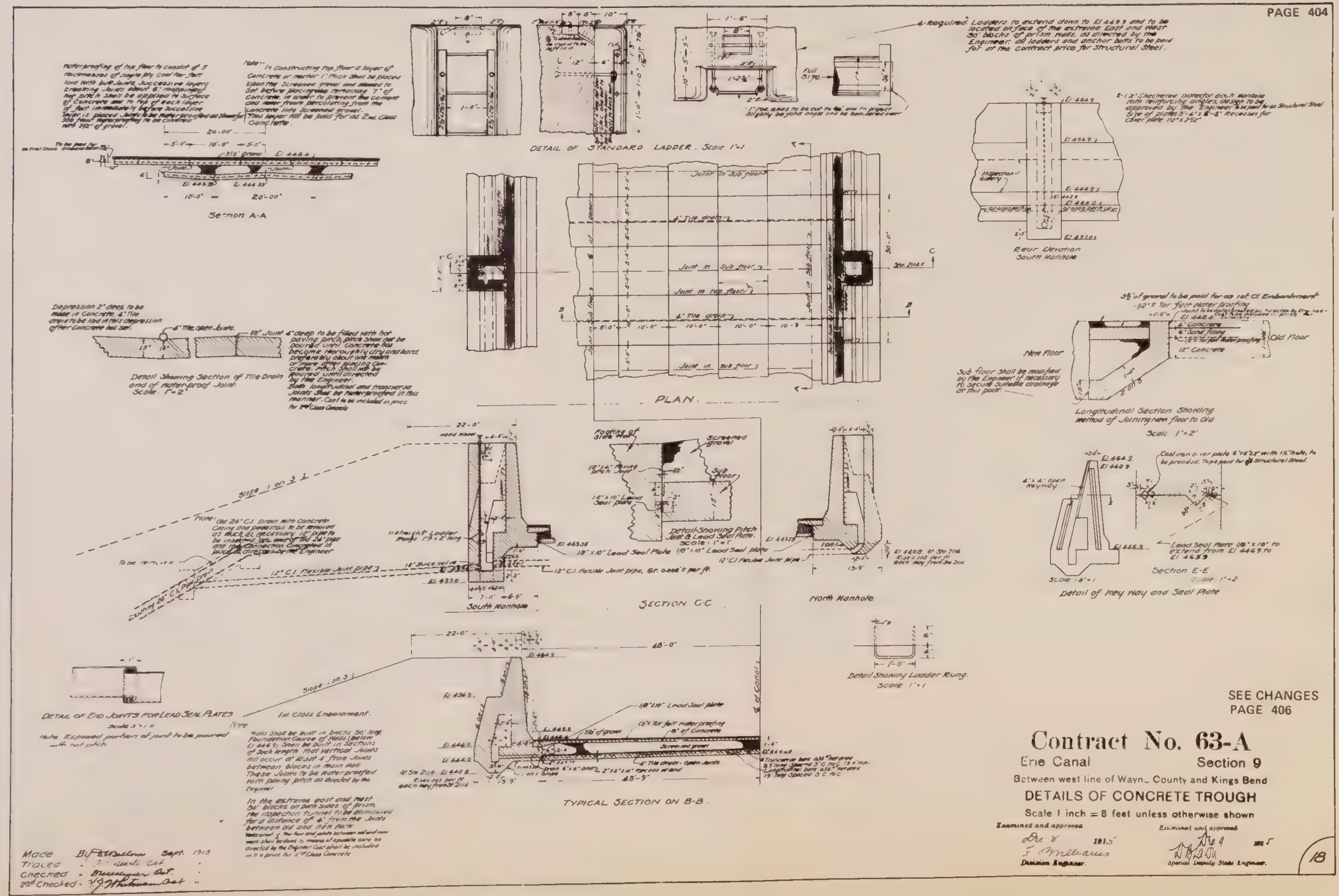
Scales as indicated

MADE BY R. C. Bellows, C. M. Colony, Aug. 1915
TRACED BY [illegible] Aug. 1915
CHECKED BY H. J. Whitman Oct. 1915

Examined and approved Dec 8 1915 — Division Engineer

Examined and approved Dec 9 1915 — Special Deputy State Engineer

11



SEE CHANGES
PAGE 406

Contract No. 63-A

Erie Canal — Section 9

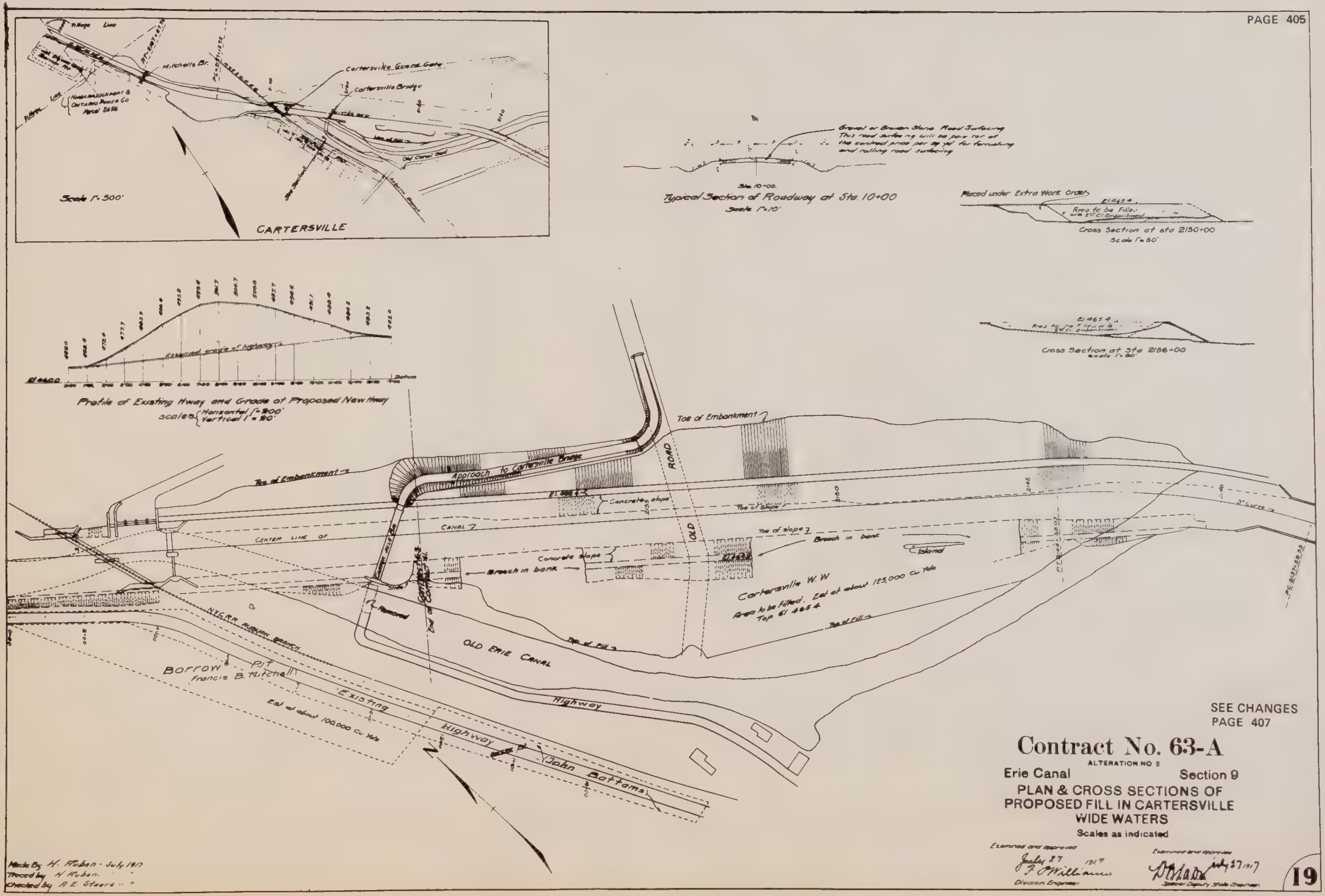
Between west line of Wayne County and Kings Bend

DETAILS OF CONCRETE TROUGH

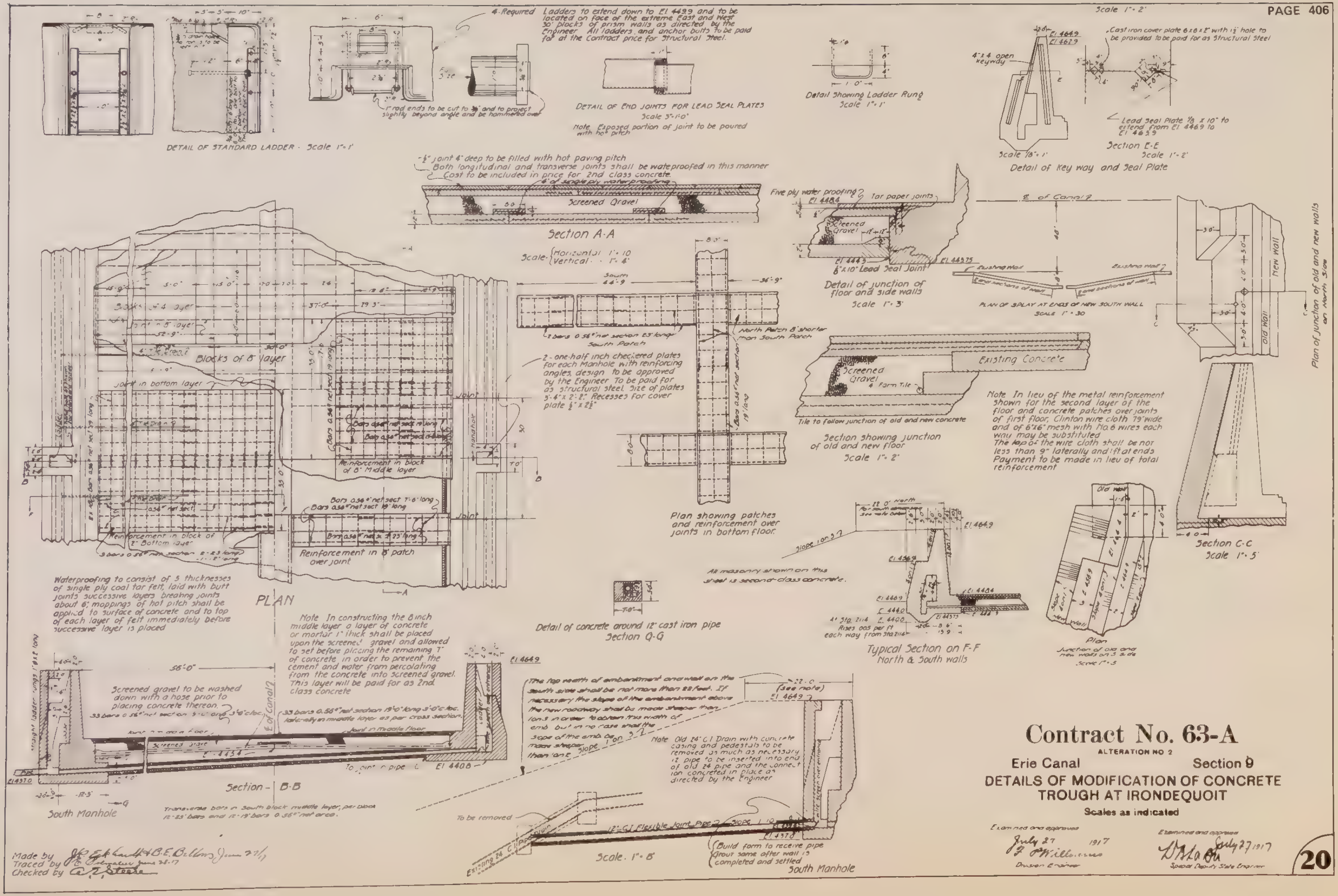
Scale 1 inch = 8 feet unless otherwise shown

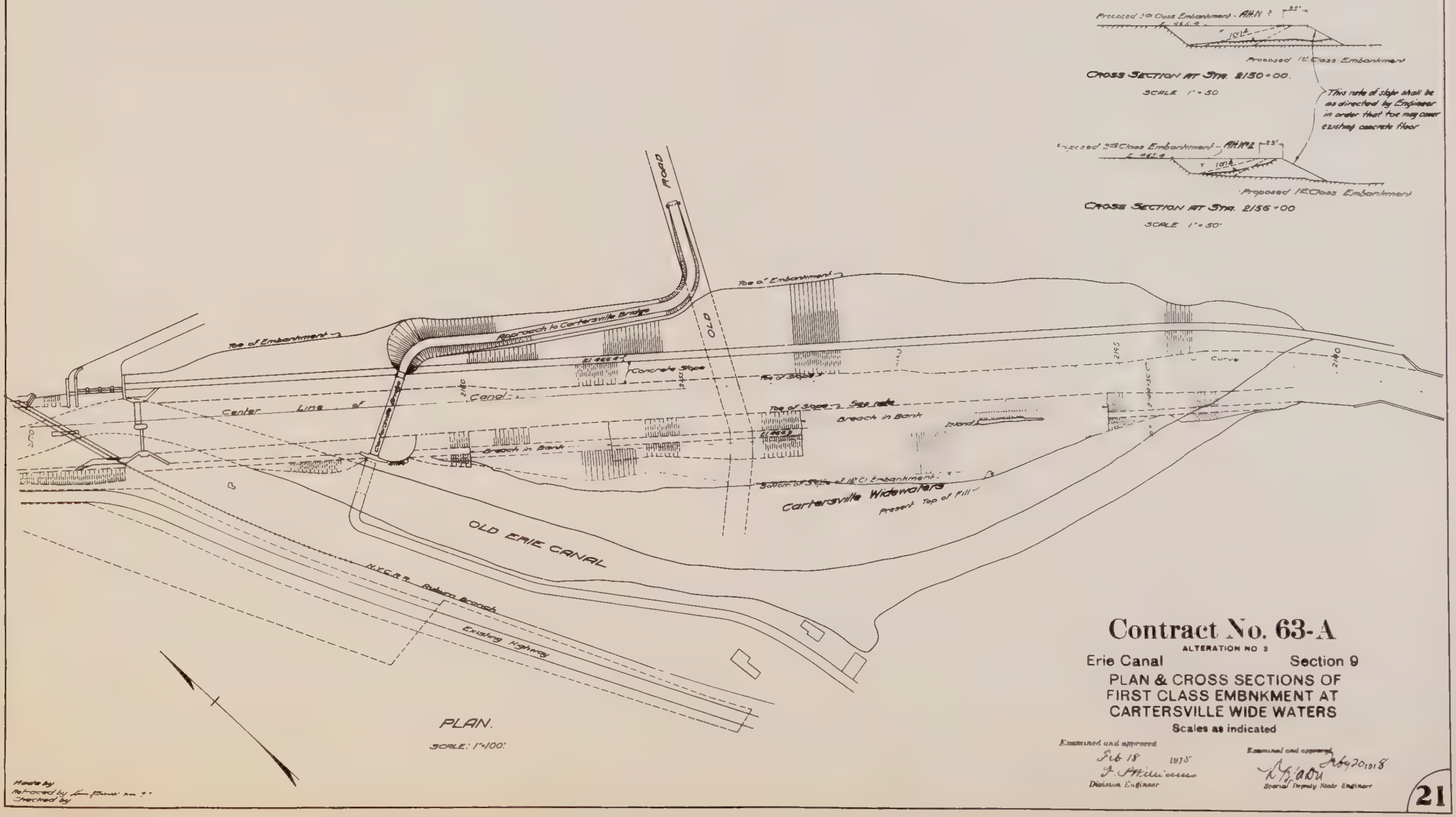
Examined and approved — Dec 8 1915 — F. Williams, Division Engineer.

Examined and approved — Dec 9 1915 — Special Deputy State Engineer.



Mitchells Br.
Cartersville Guard Gate
Cartersville Bridge
Old Canal Bed
Scale 1" = 500'
CARTERSVILLE
Typical Section of Roadway at Sta. 10+00
Scale 1" = 10'
Placed under Extra Work Order
Area to be Filled
Cross Section at sta 2150+00
Scale 1" = 50'
Cross Section at Sta 2156+00
Profile of Existing Hway and Grade of Proposed New Hway
Horizontal 1" = 200'
Vertical 1" = 20'
Toe of Embankment
Approach to Cartersville Bridge
ROAD
OLD
Concrete slope
Toe of Slope
CANAL
CENTER LINE OF
Breach in bank
Island
Cartersville W.W.
Area to be filled. Est at about 125,000 Cu Yds
Top El 465.4
Toe of Fill
OLD ERIE CANAL
Highway
NYCRR AUBURN BRANCH
Borrow Pit
Francis B. Mitchell
Existing Highway
Est at about 100,000 Cu Yds
John Bottoms
SEE CHANGES
PAGE 407
Contract No. 63-A
ALTERATION NO 2
Erie Canal
Section 9
PLAN & CROSS SECTIONS OF
PROPOSED FILL IN CARTERSVILLE
WIDE WATERS
Scales as indicated
Examined and approved
Division Engineer
Special Deputy State Engineer
Made By H. Ruben - July 1917
Traced by H. Ruben
Checked by A. E. Steere


DETAIL OF STANDARD LADDER · Scale 1"=1'
4 Required
Ladders to extend down to El 449.9 and to be located on face of the extreme East and West 30' blocks of prism walls as directed by the Engineer. All ladders and anchor bolts to be paid for at the Contract price for Structural Steel.
DETAIL OF END JOINTS FOR LEAD SEAL PLATES
Scale 3"=1'0"
Note Exposed portion of joint to be poured with hot pitch
Detail Showing Ladder Rung
Scale 1"=1'
Detail of Key way and Seal Plate
Section E-E
Lead Seal Plate 1/8 x 10" to extend from El 446.9 to El 463.9
Section A-A
Screened Gravel
Both longitudinal and transverse joints shall be waterproofed in this manner. Cost to be included in price for 2nd class concrete.
Detail of junction of floor and side walls
Scale 1"=3'
Tar paper joints
Five ply water proofing
8"x10" Lead Seal Joint
PLAN OF SPLAY AT ENDS OF NEW SOUTH WALL
Plan of junction of old and new walls on North Side
New Wall
Old Wall
Blocks of 8" layer
Reinforcement in block of 8" Middle layer
Reinforcement in block of 2" Bottom layer
Reinforcement in 8" patch over joint
Joint in bottom layer
Manhole
2 - one-half inch checkered plates for each Manhole with reinforcing angles, design to be approved by the Engineer. To be paid for as structural steel. Size of plates 3'-4" x 2'-8". Recesses for cover plate 1/2" x 2 1/2"
North Patch 8' shorter than South Patch
South Patch
Plan showing patches and reinforcement over joints in bottom floor.
Existing Concrete
Screened Gravel
Tile to follow junction of old and new concrete
Section showing junction of old and new floor
Scale 1"=2'
Note In lieu of the metal reinforcement shown for the second layer of the floor and concrete patches over joints of first floor, Clinton wire cloth 79" wide and of 6"x6" mesh with No. 6 wires each way may be substituted. The lap of the wire cloth shall not be less than 9" laterally and 1 ft at ends. Payment to be made in lieu of total reinforcement
Section C-C
Scale 1"=5'
Typical Section on F-F North & South walls
All masonry shown on this sheet is second-class concrete.
Plan
Junction of old and new walls on S. side
Waterproofing to consist of 5 thicknesses of single ply coal tar felt, laid with butt joints successive layers breaking joints about 6"; moppings of hot pitch shall be applied to surface of concrete and to top of each layer of felt immediately before successive layer is placed
PLAN
Note In constructing the 8 inch middle layer a layer of concrete or mortar 1" thick shall be placed upon the screened gravel and allowed to set before placing the remaining 7" of concrete in order to prevent the cement and water from percolating from the concrete into screened gravel. This layer will be paid for as 2nd class concrete
Detail of concrete around 12" cast iron pipe
Section G-G
Screened gravel to be washed down with a hose prior to placing concrete thereon.
Section - B-B
South Manhole
Transverse bars in South block middle layer, per block 12-23' bars and 12-19' bars 0.56" net area.
The top width of embankment and wall on the South side shall be not more than 22 feet. If necessary the slope of the embankment above the new roadway shall be made steeper than 1 on 3 in order to obtain this width of emb. but in no case shall the slope of the emb. be made steeper than 1 on 1.
Note Old 24" C.I. Drain with concrete casing and pedestals to be removed as much as necessary. 12" pipe to be inserted into end of old 24" pipe and the connection concreted in place as directed by the Engineer
To be removed
12" C.I. Flexible Joint Pipe
Build form to receive pipe. Grout same after wall is completed and settled
South Manhole
Scale 1"=8'
Made by
Traced by
Checked by
Contract No. 63-A
ALTERATION NO 2
Erie Canal
Section 9
DETAILS OF MODIFICATION OF CONCRETE TROUGH AT IRONDEQUOIT
Scales as indicated
Examined and approved
July 27 1917
Division Engineer
Examined and approved
July 27 1917
Special Deputy State Engineer
20



Contract No. 63-A

ALTERATION NO 3

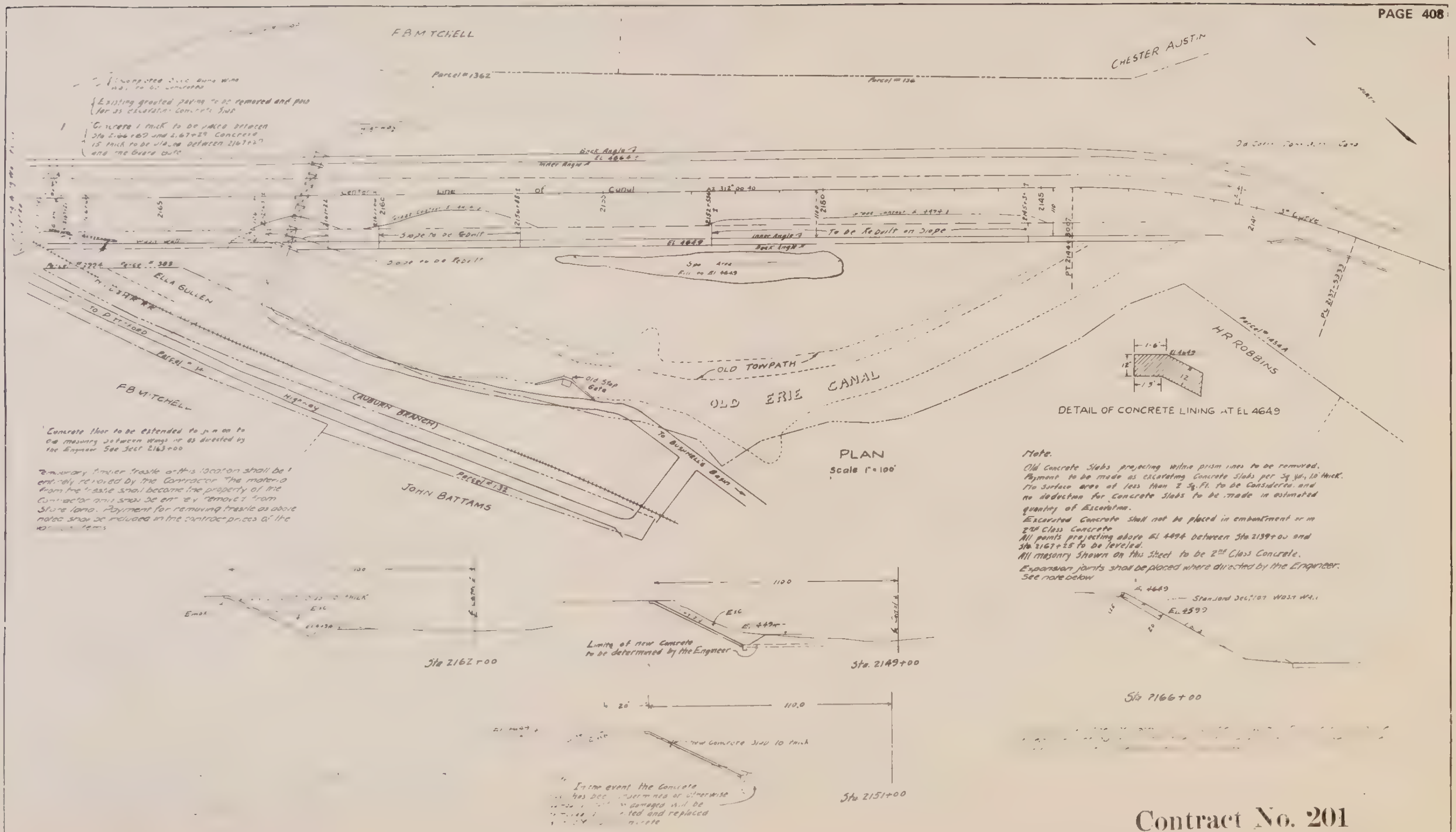
Erie Canal — Section 9

PLAN & CROSS SECTIONS OF FIRST CLASS EMBNKMENT AT CARTERSVILLE WIDE WATERS

Scales as indicated

Examined and approved
Feb 18 1918
F. Williams
Division Engineer

Examined and approved
Feby 20 1918
Special Deputy State Engineer



Contract No. 201

Erie Canal — Section 9

Completing concrete lining at Cartersville

LOCATION MAP & TYPICAL SECTIONS OF CONCRETE PRISM LINING

IRONDEQUOIT TROUGH - ANALYSIS OF 1912 BREAK

All historical references to the 1912 collapse of the Irondequoit Trough refer to the cause as the apparent collapse of the culvert (Culvert #30). As a result of the 1974 Bushnell Basin Trough collapse into a sewer tunnel under construction (court litigation still underway) and the existence of troughs at Holley and Eagle Harbor, the reason for the 1912 collapse may have future implications.

The two main reasons given for the 1912 collapse of the 1825 Erie Canal culvert were quicksand under the bottom of the culvert and the great weight of the 71 foot high embankment. (What the courts may have said afterwards has not been investigated.) However, both of these reasons can be easily explained to be of minor consequence. If quicksand did exist at the time of construction, the weight of the embankment would immediately compress the quicksand into a solid foundation. The existing 1825 and 1862 Erie Canal embankment was not raised for the new Barge Canal, but only widened. The north end of Culvert 30 was extended 41.5 feet and an additional 20 feet of fill placed on the north embankment. This increased the weight on the north end of the 1825 and 1862 Erie stone block arch culvert where the break supposedly occurred, but not excessively. A stone block arch is very strong and the foundation had over 50 years to settle.

In order to understand how this collapse most probably occurred, it is necessary to examine the history of the embankment. The Irondequoit Valley in this area contained many areas of quicksand and was considered a dangerous, but the most economical place to cross. About 1000, 20 foot long timber piles were driven into the valley floor to support the large 25 foot wide by 11.75 foot high stone block arch culvert. The culvert floor was constructed of a series of criss-crossed timbers and planks. Local sand and gravel deposits were used to construct the high embankment. To make the canal watertight, the canal prism was first lined with a network of timbers. Then, thick clay was placed over the timbers to seal the prism, but leaks into the culvert probably developed the first time the canal was filled. Over the years, most of the leaks were most likely reduced by relining the canal prism with clay on a yearly basis.

In 1840, enlargement of the Erie Canal began. Probably because of the leaks, plans for a new 30 foot wide by 16.5 foot high new stone block arch were drawn up and approved in 1851. Some time prior to 1856, however, serious leaks and possibly some stone block slippage must have occurred in the culvert. To strengthen this area, another stone block arch was constructed inside the original culvert. This solution must have worked well as the 1851 plans, which would have required removal of the overhead embankment to construct the new culvert, were discarded and new plans drawn up.

New plans dated 1856 showed that 101 feet of the 244.5 foot long culvert had been relined and specified that the remaining 50 feet at the north end and 93.5 feet at the south end also be internally lined with stone blocks. A crescent shaped void with an 8 inch maximum thickness was left between the bottom of the old arch and the top of the new arch. This void was apparently filled with coarse gravel during relining to prevent any stone block movement into this area. Then, the north end of the culvert was to be lengthened 74.5 feet so the embankment could be widened for the enlarged canal. When completed, the culvert was to have a length of 324 feet and a uniform arch barrel 23 feet wide by 9.5 feet high. This work was probably done in 1857 or soon after.

Looking East Along North Embankment - New Trough At Right
Note remains of enlarged Erie Canal timber prism lining at lower left.

To achieve the new enlarged Erie Canal 7 foot depth, 3 feet of earth were removed from the bottom of the 4 foot deep canal. Leaks were undoubtedly prevented by constructing a similar type wooden prism and lining the bottom and sides with clay. Between the late 1850's and 1910, a number of additional leaks must have occurred into the culvert. By continually relining the canal prism with clay, the leaks were kept under control.

In June of 1910, construction of the Barge Canal in the vicinity of Culvert #30 began under Contract 63. Due to the number of past culvert leaks and the constant need to reline the prism with clay,the engineers designed a waterproof concrete trough for the high embankment area. First, Culvert #30 was lengthened at the north end with 41.5 feet of concrete arch so the north embankment could be widened again. As this work progressed in 1911, leaks were noticed in the culvert and a few of the stone blocks had slipped down in an area near the north end of the double-lined culvert section. An extra work order dated March 11, 1912, called for this section of the culvert to be internally lined with reinforced concrete. Thus, a 110 foot long area was lined with a 1 foot thick concrete floor and steel reinforced, concrete arch.

In 1911, the west half of the Irondequoit Trough was constructed on the new high embankment built under Contract 41 in 1909 and 1910. Between the November 15, 1911, canal closing date and the May 15, 1912, opening date, the east half of the Irondequoit Trough over Culvert #30 was constructed after this section of the embankment had been widened. Approximately 6-7 feet of earth was removed from the bottom of the 7 foot deep enlarged Erie Canal to construct the concrete trough for the new 12 foot deep Barge Canal. After the top of the 1825 sand and gravel embankment had been leveled, the trough walls and floor were constructed.

Looking West Shortly After Break

Between May of 1912 when the trough was filled and through August, it is not known if any problems occurred. At approximately 8:45 on the morning of September 3, the culvert apparently gave way, the trough collapsed and about 500 feet of embankment was washed out.

On September 4, 1912, the Rochester Democrat and Chronicle published a fairly detailed report of the "Canal Break Near Bushnells Basin" in its local news section. (The full report, although it does contain some incorrect information, is included at the end.) The following information was obtained from this report:

Looking East Shortly After Break

"Superintendent Leddy was at the scene of the break at 9 o'clock. He said trouble had been indicated by the canal current some minutes before the break occurred and he had been notified that something was wrong. Patrolman George Schaefer said he went over the section at 8 o'clock and saw no indication of trouble, but a little later he noticed that the current in the canal had been reversed.

A gang of twenty-five men were engaged at the time of the break in putting a jacket of concrete inside the arch. The annihilation of all was averted by the alertness of Michael Sweeney, foreman.

At 8:30 o'clock yesterday morning, Sweeney saw a stream of water pouring out the side of the culvert arch and climbed the embankment, to see what was the trouble. He reached the big conduit in time to warn the men. All immediately reached points of safety, except one laborer who held back until the bank gave way. He was buried in the deluge of sand and water, but he was rescued by his fellows.

After Foreman Sweeney discovered the leak and gave warning to his men, he telephoned to Superintendent Leddy at the weigh-lock."

Since Sweeney had to climb the embankment to warn the men, it must be assumed that they were not at work in the culvert at the time of the break, but were on the way back to work in the culvert that day to inspect the reinforcing work that had been under construction. When he saw the large leaks, Sweeney ran out to warn the other men who were apparently up on top watching the reversed current in the canal and then telephoned Superintendent Leddy. Therefore, the trough floor failed first.

At this point, it would not have made any difference if the culvert failed or not, as there was no way the embankment could have been saved. With over 60 feet of head, the water could have easily washed out the side of the embankment in the area of the

Looking East - Embankment Being Prepared for Timber Trough
Note water hose in foreground used to consolidate soil.

Looking West - Debris Being Buried in Embankment
Note temporary headwall for culvert exit at lower right.

culvert exit and left the culvert intact. The north end of the culvert did fail, but it is not known when. The failure possibly first occurred in the 50 foot long, stone block arch section that was built according to the 1856 plans. This was the area being internally reinforced at the time of the break. Due to the extremely wide 23 foot width and low 9.5 foot height of this section of the culvert, a large force is needed at the base of the culvert to keep the arch ceiling in place. The failure here could have occurred early from loss of wall support or late when the water removed the surrounding soil. Eventually, about 150 feet of the north culvert end, including the new 41.5 foot long, reinforced concrete arch section, disappeared.

North End of Culvert Has Been Washed Away

Although failure at this time was attributed to quicksand and culvert collapse, the actual reason was due to the indirect result of what is now known as a piping failure. For nearly 90 years, this embankment had been losing soil as leaks washed fine material into the culvert and the stream carried it away unnoticed. By lining the canal with clay, leaks were always plugged at the source, while voids were left below. When the bottom of the canal was excavated for the Barge Canal,all the plugs at the top were removed. Then the concrete trough was placed on an embankment area that undoubtedly had many voids hidden inside. For 4 months, the water filled concrete trough was able to support itself, but the concrete slab floor was slowly cracking and settling. The trough walls would show no sign of sag as they are capable of spanning long distances before collapsing as was shown at the Bushnell Basin Trough in 1974. When finally the slab floor cracked enough to let water through, the water immediately flowed down to the culvert through all the voids. This created more voids which caused the slab to settle quickly.

As the trough floor dropped out and the north side of the embankment washed away, the trough walls remained suspended. By the time, they could no longer support themselves, a large scour hole reaching down to the top of the culvert had probably occurred. When the walls buckled and the huge blocks fell in disarray, one apparently struck the top of the culvert and caused it to collapse. This is the only object heavy enough to have caused a double reinforced 1825 section

of the culvert to fail. Whether this triggered the rest of the north culvert end to fail, or it had failed earlier, is not known. The trememdous force of the water carried a few of these hugh blocks over 200 feet, but adjacent and downstream property damage was minimal as most of the area was farm land.

Of the four concrete troughs (Bushnell Basin, Irondequoit, Holley and Eagle Harbor) that were constructed on high embankment areas, three have failed. In 1912, the Irondequoit Trough failed indirectly from piping, in 1927 the Eagle Harbor Trough failed probably from settlement and piping, and in 1974 the Bushnell Basin Trough failed as a consequence of sewer tunnel construction.

As originally designed, the concrete troughs are a good example of sound engineering judgment. The troughs were built as watertight as possible, but small leaks were expected to occur. As long as the leaks were kept under control by the tightness of joints and cracks, no problems would have occurred. Problems did develop, however, because of the failure to recognize that a seemingly insignificant loss of soil by water can eventually lead to loss of foundation support.

North End of Culvert After Partial Excavation
Note arch inside of arch and reinforced concrete arch.

Looking East-South Trough Wall was later constructed 8 feet out of alignment to avoid side wall supports for timber flume.

ROCHESTER DEMOCRAT AND CHRONICLE, WEDNESDAY, SEPTEMBER 4, 1912

BIG LOSS BY NINETY-FOOT CANAL BREAK

FIRST ESTIMATE OF DAMAGE PUTS FIGURE AT $250,000.

25 MEN NEAR DEATH

AT WORK IN CULVERT WHEN LEAK IS DISCOVERED

MAY END SEASON'S TRAFFIC

CULVERT ARCH BREAKS, EMBANKMENT CAVES IN AND CONCRETE AQUEDUCT FALLS, LETTING THOUSANDS OF TONS OF WATER INTO THE VALLEY OF IRONDEQUOIT CREEK - ONE HURT

Concrete walls of an Erie Canal aqueduct confining thousands of tons of water, were undermined and gave way at Bushnell's Basin yesterday morning, precipitating a deluge into Irondequoit Creek. Twenty-five workmen engaged in repairing a culvert below the canal bed had a close call and traffic was tied up, probably for the rest of the season.

The section in which the break occurred has been watched closely since the break at almost identically the same point May 20, 1911, when traffic was delayed to June 30th. The section takes in culvert No. 30, over Irondequoit Creek, about half a mile west of Bushnell's Basin railway station.

The culvert was built in 1840, but has been strengthened several times. A gang of twenty-five men were engaged at the time of the break in putting a jacket of concrete inside the arch. The annihiliation of all was averted by the alertness of Michael Sweeney, foreman.

One Caught When Break Comes

At 8:30 o'clock yesterday morning Sweeney saw a stream of water pouring out the side of the culvert arch and climbed the embankment to see what was the trouble. He reached the big conduit in time to warn the men. All immediately reached points of safety, except one laborer who held back until the bank gave way. He was buried in the deluge of sand and water, but he was rescued by his fellows.

At Bushnell's Basin a year ago, barge canal Contractors Myers & McWilliams erected one of the triumphs of canal engineering, an immense concrete aqueduct about half a mile long and ninety feet wide. Under the big conduit was a ninety-foot embankment and at its foot, allowing for the flow of Irondequoit Creek, was old culvert No. 30.

It is believed that quicksand under the culvert allowed the ends of the arch to slip and the keystone to drop from place. With the culvert gone the embankment caved in and for a few seconds the concrete aqueduct was suspended. Then it broke of its own weight and the waters of the canal rushed into Irondequoit Creek, carrying destruction to the farming district within 500 feet of the banks.

Guard Locks Serve Their Purpose

The strict watch kept on this section by Superintendent Leddy resulted in prompt work to avert loss by the inundation of the farming county to the north. After Foreman Sweeney discovered the leak and gave warning to his men, he telephoned to Superintendent Leddy at the weightlock. Orders were given to close the new steel guard lock at Cartersville and the old guard lock at Bushnell's Basin. Action was the matter of a few moments, and damage was confined to land between the guard locks which are about a mile apart.

The break created a sensation along the banks of Irondequoit Creek, but, owing to the small area of land on the bottoms, the loss to farmers was less than might be expected. Prompt work in closing the stop gates reduced losses to a minimum so far as damage to crops is concerned.

Superintendent Leddy was at the scene of the break at 9 o'clock. He said trouble had been indicated by the canal current some minutes before the break occurred and he had been notified that something was wrong. Patrolman George Schaefer said he went over the section at 8 o'clock and saw no indication of trouble, but a little later he noticed that the current in the canal had been reversed.

Quicksand Cause of Trouble

Superintendent Leddy said yesterday afternoon that it was his opinion that quicksand at the bottom of the culvert was responsible for the breaking of the arch and that its collapse left the aqueduct unsupported.

State Superintendent of Public Works Duncan W. Peck came from Albany yesterday afternoon with William Meggher, State Superintendent of Claims. After making an examination he returned to the Powers Hotel where he will consult with the canal engineers as to the best method of repairing the damage. He gave the opinion that the canal could be repaired by the building of a wooden conduit over Irondequoit Creek, so as to allow traffic late this month. In case it is believed necessary to rebuild the culvert and reconstruct the concrete trough it will take at least six weeks, and probably through traffic will be suspended the rest of the season.

The damage was principally to canal work and is estimated at from $250,000 to $500,000. At the first glance, appraisers thought that damage to farm property would be confined to $10,000, as much of the valley of Irondequoit Creek has been acquired by the State.

Where 25 Were Near Death

When the break of 1911 occurred it was determined to strengthen the culvert by stripping it and placing a foot-thick jacket of concrete, reinforced, over its top. In view of the fact that this would necessitate excavating ninety feet of earth covering the culvert it was determined to place the jacket inside the culvert. This was the work in progress.

Superintendent Peck said he thought it was the most serious break in years. The feed supply for this section has been shut off at Lockport and the level from Lockport to Bushnell's Basin is being maintained.

The break came at a time, when boatmen were about to reap their annual harvest as the crops of wheat, oats, corn and barley are ready for shipment from the grain fields of the West and already big lake fleets are enroute to Buffalo. The canal seasons of the past two years have been unprofitable by delays due to breaks and now comes a big break that practically ties up the canal for the season.

Sub-Contractors Heavy Losers

Leary & Morrison, subcontractors, will be heavy losers. They estimate the damage to their machinery and materials at $14,000. Immense blocks of concrete, twenty-one feet high and from two to eight feet wide, forming the sides of the big concrete trough, were carried at least 500 feet, some farther.

State Engineer John A. Bensel arrived in Rochester from Albany late last night, accompanied by his secretary, Mr. Neville: I. A. Dwight, engineer of the Eastern Division of the canal with headquarters at Albany; William Kasti, Deputy State Engineer and others. A conference was held at midnight at the Hudson Hotel after which Mr. Bensel said:

"From representations made to me by the engineers, the Superintendent of Public Works, Duncan W. Peck and Engineer E. J. McGovern, I am of the opinion that the break can be repaired in about thirty days. It is possible to build a wooden flume across the gorge which will carry traffic until a more substantial structure can be devised.

I have arranged for a conference of all the canal officials at the Powers Hotel at 8:30 tomorrow morning and at the close of this conference we will go to the scene of the break. After we have thoroughly examined the situation we will determine on a plan to restore the canal service within the shortest possible time."

Mr. Bensel would venture no prediction as to the cause of the break except to indicate his belief that the construction of the barge canal in connection with the operation of the old canal was dangerous at all times.

00980
LRI